

Massachusetts Department of Public Safety  
Public Hearing on State Building Code 7<sup>th</sup> Edition  
November 6, 2007

**Submitted Public Comments**

Chapters 5, 7

Proposed by the Fire Safety Construction Advisory Council (FSCAC)

1.) This code change proposal requests that the current Massachusetts Building Code requirements for Height and Area Limits be retained and only be modified to reference the IBC use and construction types.

**Delete IBC 2003, Chapter 5, General Building Heights and Areas, Section 503 through Section 506, including Table 503 proposed to be adopted from the IBC 2003 and substitute 1993 BOCA, Chapter 5, General Building Limitations, Section 503 through Section 506, including Table 503 and Table 506.4.**

The IBC 2003 Height and Area limits of Table 503 with the modifications of Sections 504, 506, and 507 reduce the fire safety requirements of the code and the basic code concept of balanced design. The area limits of IBC 2003 Section 503 increase reliance on fire suppression and reduce reliance on fireresistant construction. The changes to the area limits of Table 503, with modifications, results in an across-the-board increase in the allowable area, per floor, of between 60% and 180% for buildings of up the three stories in height. The existing Massachusetts State Building Code, based on the 1993 BOCA area limitation requirements provides a more balanced design approach and recognizes the importance of both fireresistant construction and fire suppression in building safety.

2.) This code change proposal is a less drastic modification of the Height and Area Limits, and provides an alternate approach to limiting the allowable area increases in Chapter 5 that will otherwise become part of our next code. Following the lead of the State of California, this proposal will allow either increasing the allowable height of a building by one (1) story or increasing the allowable area beyond the limits established in Table 503, but not both. This amendment will also remove the tripling of the maximum total allowable floor areas for buildings three-stories or taller and substitut the doubling of one story areas for multistory buildings.

**Amend IBC Sections 504.2, 506.3, 506.4, and 506.4.1. Revisions to Sections 504.2 and 506.3 would to remove the allowance of the combined height and area increase with automatic sprinklers for certain occupancies. Revisions to Section 506.4 would remove the tripling of the maximum allowable floor areas for buildings three-stories or taller and substituting the doubling of one story areas for multistory buildings.**

A balanced approach to fire protection (requiring active sprinkler protection, and passive fire proof construction) based on the historical use of height and area provisions and data demonstrate Massachusetts's current BOCA Based minimum requirements for the built environment have safeguarded the public health, safety and general welfare of the occupants and to the property as a whole.

3.) This code change proposal requests that the current Massachusetts Building Code restriction on the use of combustible materials in firewall be retained in the 7<sup>th</sup> edition of the Massachusetts Building Code.

**Delete the exception to IBC 2003 Section 705.3 (allowing noncombustible materials in fire walls in buildings of Type V construction), with no substitution.**

Section 707.1 of 780 CMR, 6<sup>th</sup> edition, the current Massachusetts Building Code requires firewalls to be constructed of "any approved noncombustible material" without exception. This proposal will maintain the same requirement in 780 CMR, 7<sup>th</sup> edition, based on the IBC 2003 Code. The IBC 2003, Section 705.3 requires all firewalls to be of noncombustible construction. However, an exception permits fire wall to be constructed of combustible materials in buildings constructed of Type V construction.

Firewalls are the fire fighters' last line of defense, and building occupants safe haven from fire. It does not make any sense to try to stop fire with something that burns. Adopting this firewall exception would be a significant step back in terms of fire safety and occupant protection from the current 6<sup>th</sup> edition of the Building Code.

FSCAC believes that if the height and Area Limitation, and combustible firewall provisions of the 2003 IBC are adopted, the safety of the public, building occupants, and firefighters will be compromised. Other states that have adopted the ICC Codes have modified the height and limits or minimum egress requirements to limit the size of buildings, or compensate for the increased size allowed by the IBC by requiring larger exits. Massachusetts should do the same.

## IT'S ABOUT BUILDING SAFETY

The proposed Massachusetts State Building Code building size limitations are to be based on the 2003 International Building Code (IBC) building size limitation requirements. The IBC size limits are much less restrictive than the long-standing balanced design approach found in the current Massachusetts code and fails to recognize the importance of providing both fire-resistant construction and fire suppression in building safety.

So, what's the problem with allowing larger floor areas in buildings and between firewalls?

Larger Floor Areas result in:

- Larger occupancies per floor, more people to evacuate.
- Bigger floor areas and more combustibles per fire area.
- Bigger Fires, more likely to spread to adjacent buildings.
- Longer travel distances to exits.
- Longer hose lengths, tether line lengths, and ladders.
- Fewer protected areas from which to fight a fire.
- Total dependence on sprinklers to control fire.
- Building sprinkler requirements not triggered as soon.

While fire suppression system such as sprinklers provide an important component of building safety, along with fire detection and fireproof compartmentalization, suppression cannot be relied upon as the sole method of building protection. The NIST report on the collapse of the World Trade Center Towers identified balanced design, as an important component of safer buildings.



According to NFPA, fire investigators have found that on average 16% of the time the sprinkler system did not operate as intended due to lack of proper maintenance, faulty equipment such as sprinkler heads, lack of adequate water supply, or simply because the sprinkler system was shut off.

Other states that have adopted the ICC Codes have modified the height and limits or minimum egress requirements to limit the size of buildings, or compensate for the increased size allowed by the IBC by requiring larger exits.

The State of New Hampshire, Adopted IBC 2000 with amendments to Chapter 5 retaining BOCA Table 503 Area Limits and §506 Area Modifications including Table 506. New Hampshire Fire Marshal, John Degnan stated that the main reasons he proposed keeping the existing height and area tables were: 1) it brought automatic sprinklers in sooner, and 2) the safety for firefighters, such as shorter hose lengths, tether line lengths, and ladders.

The State of New Jersey has also modified IBC 2003 Table 506 by limiting the height of certain use groups and construction types.

The State of California's soon to be adopted new building code, based on the 2006 IBC, will include significantly reduced Area Limits as a result of reductions in sprinkler based area increase allowances (The proposed Connecticut Code Change Proposal is based on the California modifications to the sprinkler based area increases).

The State of Connecticut has modified the IBC in a different way greatly increasing the requirements for egress width per occupant served. Connecticut modified IBC Table 1005.1 by increasing the minimum egress door width per occupant by 25% and the minimum egress stair width per occupant by 33%.



A comparison between Massachusetts State Building Code size Limits and the proposed IBC Based building Limits for Business and Assembly Use buildings, of Type 2B and Type 2C Construction, indicates that the proposed IBC size limits allow floor areas per floor 37% to 126% larger and floor areas per building 8% to 69% larger than the current Massachusetts code.

For Residential Multi-Family and Dormitory Uses, comparisons between the current Massachusetts building size limits and the proposed IBC 2003 based building size limits for the Type 3A, 3B, 5A, and 5B combustible Construction Types shows even greater IBC Allowable building size increases when compared to the current Massachusetts State code, with some area increases as high as 197% per floor, and 182% per building.

The Table on the following page shows the maximum allowable Table 503 building size limitations per floor based on the sprinkler and frontage increases permitted in the proposed IBC code as compared to the current Massachusetts State building code for a Typical R-2, Multi-

## Why the next edition of the MA Building Code should reduce the ICB Height and Area Limits

Family Dwelling, Assisted Living Residential Facility or Dormitory Building.

## Current Massachusetts Code v. proposed IBC based Code, building size Limitations

Current Massachusetts Building Code Construction Type*	Percent Area Limits Increases** that would be allowed in the proposed IBC based Building Code		
	5-story***	4-story***	3-story
2C (IIB), Unprotected Steel	62%	158%	158%
3A (IIA), Protected Masonry and Wood	78%	111%	182%
3B (IIIB), Unprotected Masonry and Wood	94%	94%	158%
5A (VA), Protected Wood	-	37%	82%
5B (VB), Unprotected Wood	-	70%	126%

\* Protected, or Unprotected by a covering of fire proof or fire resistant material such as concrete, masonry, or gypsum board, (equivalent IBC designation)

\*\* Percentage increase of allowable floor area in building under proposed IBC/2003 as compared to identical buildings under the current Massachusetts State building code for a Type R-2 Use, Multi Family Dwelling, or Dormitory, with an NFPA 13 Sprinkler System and, 35%, 30 foot wide street frontage

\*\*\*Maximum allowable area of building is limited to three times the total allowable area per floor.

Massachusetts has an older building stock, much of which is constructed with wood and heated for half of the year by fossil fuels. The buildings in our older cities are often closely packed together. These conditions are not common to the country as a whole, and are one of the reasons why Massachusetts should have provisions more stringent than provided for in the Model Codes.



The proposed IBC building size limits were established as a compromise between the three former model code groups, and are based on the least restrictive area limits without any technical justification. For the proper protection of building occupants, fire fighters, and adjacent neighborhoods, and to insure that sprinkler requirements are triggered at a smallest possible building size, the area limits in the current Massachusetts State building code should be taken into consideration, and the proposed IBC building size limits reduce.

For more information, or to get involved in keeping the current Mass Height and Area Limits, contact FSCAC at PO Box 485, Sutton, MA 01590-0485, phone 866-723-3623, or [www.firesafeconstruction.org](http://www.firesafeconstruction.org)

(Photos of 1/3/07 4-alarm fire in Georgetown MA, of which Massachusetts State Fire Marshal Coan commented: "It is important to understand why there was this much damage in a sprinklered building.")

Massachusetts Department of Public Safety  
Public Hearing on State Building Code 7<sup>th</sup> Edition  
November 6, 2007

**Submitted Public Comments**

Chapters 10

Proposed by Harold R. Cutler, PE

**- Harold R. Cutler, P.E.**

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November 6, 2007

Board of Building Regulations  
and Standards  
One Ashburton Place  
Boston, MA 02108-1618

Dear Board Members:

Subject: Proposed Amendment  
Section 1018.1  
Seventh Edition of the  
Massachusetts State  
Building Code

This letter is submitted to proposed an amendment to Section 1018.1 of the proposed Seventh Edition of the MSBC concerning numbers of exits from buildings.

This section is often interpreted to require two exits from a small or moderate sized room or space at the level of exit discharge of a building even when that room or spaces does not require two exits by the occupant load and travel distance criteria of the proposed Section 1014.1. For example, a small pizza shop in a strip mall with less than 50 occupants and less than 75 feet of internal travel would be required to have a second (typically a rear exit to achieve the require remoteness) exit by the strict application of section 1018.1 if the shop were located in a building required by the section to have two or more exit available for all occupants.

It is proposed to amend Section 1018.1 by addition of an exception that reads as follows:

Exception: Individual rooms or spaces at the level of exit discharge that are not required to have two exits by the provisions of Section 1014.1 shall be permitted to have a single exit directly to the exterior provided the interior and exterior common path of travel does not exceed the limitations of Section 1013.3 for the occupancy of the space.

If you have any questions concerning this proposal, please do not hesitate to contact me.

Very truly yours

*Harold R. Cutler*

Harold R. Cutler

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November 6, 2007

**Submitted Public Comments**

Chapters 12

Proposed by Harold R. Cutler, PE

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November 6, 2007

Board of Building Regulations  
and Standards  
One Ashburton Place  
Boston, MA 02108-1618

Dear Board Members:

Subject: Proposed Amendment  
2003 Edition of the International  
Mechanical Code

This letter is to propose an amendment of the 2003 Edition of the International Mechanical Code that is to be proposed to be adopted as a reference document of the Seventh Edition of the Massachusetts State Building Code.

The proposed amendments would be those adopted in Section 510 of the 2006 Edition of the IMC concerning hazardous exhaust systems (copy attached). The proposed amendments would adopt changes in the 2006 IMC that recognize that most laboratory hood exhaust systems do not involve hazards that require their classification as hazardous exhaust systems. When not considered hazardous exhaust systems, many onerous requirements of the hazardous exhaust system section that are not appropriate to laboratory exhaust system would not be applicable.

This amendment is especially needed in Massachusetts where there is significant construction of laboratory facilities by the biotech and pharmaceutical industries.

IMC 2003 Provisions

Section 510.2 requires that a hazardous exhaust system shall be required for operations involving the handling or processing of hazardous materials if, in the absence of the exhaust system and under normal operating conditions, there is the potential for any one of the following conditions to exist:

1. A flammable vapor, gas, fume, mist or dust is present in concentrations exceeding 25 percent of the lower flammability limit of the substance for the expected room temperature.
2. A vapor, gas, fume, mist or dust with a health hazard

rating of 4 is present in any concentration.

3. A vapor, gas, fume, mist or dust with a health hazard rating of 1, 2, or 3 is present in concentrations exceeding 1 percent of the median lethal concentration of the substance for acute inhalation toxicity.

This definition clearly requires that ducts carrying industrial scale quantities of combustible materials would be a hazardous exhaust system either due to the flammability of the materials (vapors, mists or solids) in suspension or coating the interior of the duct.

Without modification or interpretation, the hazardous exhaust system classification criteria above must be applied to laboratory hood exhaust systems. For example, the concentration of flammable vapors released at the surface of a Class I flammable liquid in an open beaker in a laboratory hood would exceed 25% of the lower flammability limit without exhaust ventilation.

Hazardous exhaust systems are subject to the design requirements in IMC Section 510 including *but not limited to* the following:

1. Systems shall be designed and operated in such a manner that flammable contaminants are diluted in non-contaminated air to maintain concentrations in the exhaust flow below 25% of the contaminant's lower flammable limit.
2. Systems shall be independent of other exhaust systems.
3. Systems shall not share common shafts with other duct systems except where such systems are hazardous exhaust systems originating in the same fire area.
4. Exhaust air shall not be recirculated to occupied areas unless the contaminants have been removed.
5. Air containing certain hazardous materials shall not be recirculated.
6. Systems that penetrate floor assemblies shall be enclosed in fire resistance rated shafts.
7. Systems that penetrate fire separation walls shall be enclosed in rated construction from the penetration of the first such assembly to the outside exhaust opening except where an automatic fire suppression system is installed in the duct.
8. Fire dampers are not required in hazardous exhaust system ducts.
9. A fire suppression system is required in a hazardous exhaust system duct unless the materials being conveyed in the duct are nonflammable and noncombustible.

#### 2006 IMC Amendments

The criteria for classification of hazardous exhaust systems have been refined in the 2006 amendments to the International Mechanical Code (IMC). Those amendments include an exception to the current rules for determining when an exhaust system must be

classified as high hazard (see discussion above). The exception states:

Exception: Laboratories, as defined in section 510.1, except where the concentrations listed in Item 1 are exceeded or a vapor, gas, fume, mist or dust with a health-hazard rating of 1, 2, 3, or 4 is present in concentrations exceeding 1 percent of the median lethal concentration of the substance for acute inhalation toxicity.


The definition of a "laboratory" inserted in IMC Section 510.1 states:

For the purposes of the provisions of Section 510, a laboratory shall be defined as a facility where the use of chemicals is related to testing, analysis, teaching, research, or developmental activities. Chemicals are used or synthesized on a non-production basis, rather than in a manufacturing process.

If this amendment were in force and the concentrations of hazardous materials in a specific laboratory duct system do not exceed the limitations in the exception to Section 510.2, the laboratory exhaust system would not be required to be classified as a hazardous exhaust system and would not be subject to the technical requirements imposed on such systems.

If you have any questions this proposal that I might answer, please do not hesitate to contact me.

Very truly yours



Harold R. Cutler

Encl.

actual or simulated cooking, such as with smoke candles, smoke puffers, etc.

## SECTION 508 COMMERCIAL KITCHEN MAKEUP AIR

**508.1 Makeup air.** Makeup air shall be supplied during the operation of commercial kitchen exhaust systems that are provided for commercial cooking appliances. The amount of makeup air supplied shall be approximately equal to the amount of exhaust air. The makeup air shall not reduce the effectiveness of the exhaust system. Makeup air shall be provided by gravity or mechanical means or both. For mechanical makeup air systems, the exhaust and makeup air systems shall be electrically interlocked to insure that makeup air is provided whenever the exhaust system is in operation. Makeup air intake opening locations shall comply with Sections 401.4 and 401.4.1.

**508.1.1 Makeup air temperature.** The temperature differential between makeup air and the air in the conditioned space shall not exceed 10°F (6°C).

### Exceptions:

1. Makeup air that is part of the air-conditioning system.
2. Makeup air that does not decrease the comfort conditions of the occupied space.

**508.2 Compensating hoods.** Manufacturers of compensating hoods shall provide a label indicating minimum exhaust flow and/or maximum makeup airflow that provides capture and containment of the exhaust effluent.

## SECTION 509 FIRE SUPPRESSION SYSTEMS

**509.1 Where required.** Commercial cooking appliances required by Section 507.2.1 to have a Type I hood shall be provided with an approved automatic fire suppression system complying with the *International Building Code* and the *International Fire Code*.

## SECTION 510 HAZARDOUS EXHAUST SYSTEMS

**510.1 General.** This section shall govern the design and construction of duct systems for hazardous exhaust and shall determine where such systems are required. Hazardous exhaust systems are systems designed to capture and control hazardous emissions generated from product handling or processes, and convey those emissions to the outdoors. Hazardous emissions include flammable vapors, gases, fumes, mists or dusts, and volatile or airborne materials posing a health hazard, such as toxic or corrosive materials. For the purposes of this section, the health hazard rating of materials shall be as specified in NFPA 704.

For the purposes of the provisions of Section 510, a laboratory shall be defined as a facility where the use of chemicals is related to testing, analysis, teaching, research or developmental

activities. Chemicals are used or synthesized on a non-production basis, rather than in a manufacturing process.

**510.2 Where required.** A hazardous exhaust system shall be required wherever operations involving the handling or processing of hazardous materials, in the absence of such exhaust systems and under normal operating conditions, have the potential to create one of the following conditions:

1. A flammable vapor, gas, fume, mist or dust is present in concentrations exceeding 25 percent of the lower flammability limit of the substance for the expected room temperature.
2. A vapor, gas, fume, mist or dust with a health-hazard rating of 4 is present in any concentration.
3. A vapor, gas, fume, mist or dust with a health-hazard rating of 1, 2 or 3 is present in concentrations exceeding 1 percent of the median lethal concentration of the substance for acute inhalation toxicity.

**Exception:** Laboratories, as defined in Section 510.1, except where the concentrations listed in Item 1 are exceeded or a vapor, gas, fume, mist or dust with a health-hazard rating of 1, 2, 3 or 4 is present in concentrations exceeding 1 percent of the median lethal concentration of the substance for acute inhalation toxicity.

**[F] 510.2.1 Lumber yards and woodworking facilities.** Equipment or machinery located inside buildings at lumber yards and woodworking facilities which generates or emits combustible dust shall be provided with an approved dust-collection and exhaust system installed in conformance with this section and the *International Fire Code*. Equipment and systems that are used to collect, process or convey combustible dusts shall be provided with an approved explosion-control system.

**[F] 510.2.2 Combustible fibers.** Equipment or machinery within a building which generates or emits combustible fibers shall be provided with an approved dust-collecting and exhaust system. Such systems shall comply with this code and the *International Fire Code*.

**510.3 Design and operation.** The design and operation of the exhaust system shall be such that flammable contaminants are diluted in noncontaminated air to maintain concentrations in the exhaust flow below 25 percent of the contaminant's lower flammability limit.

**510.4 Independent system.** Hazardous exhaust systems shall be independent of other types of exhaust systems. Incompatible materials, as defined in the *International Fire Code*, shall not be exhausted through the same hazardous exhaust system. Hazardous exhaust systems shall not share common shafts with other duct systems, except where such systems are hazardous exhaust systems originating in the same fire area.

**Exception:** The provision of this section shall not apply to laboratory exhaust systems where all of the following conditions apply:

1. All of the hazardous exhaust ductwork and other laboratory exhaust within both the occupied space and the shafts is under negative pressure while in operation.

2. The hazardous exhaust ductwork manifolded together within the occupied space must originate within the same fire area.
3. Each control branch has a flow regulating device.
4. Perchloric acid hoods and connected exhaust shall be prohibited from manifolding.
5. Radioisotope hoods are equipped with filtration and/or carbon beds where required by the registered design professional.
6. Biological safety cabinets are filtered.
7. Provision is made for continuous maintenance of negative static pressure in the ductwork.

Contaminated air shall not be recirculated to occupied areas unless the contaminants have been removed. Air contaminated with explosive or flammable vapors, fumes or dusts; flammable, highly toxic or toxic gases; or radioactive material shall not be recirculated.

**510.5 Design.** Systems for removal of vapors, gases and smoke shall be designed by the constant velocity or equal friction methods. Systems conveying particulate matter shall be designed employing the constant velocity method.

**510.5.1 Balancing.** Systems conveying explosive or radioactive materials shall be prebalanced by duct sizing. Other systems shall be balanced by duct sizing with balancing devices, such as dampers. Dampers provided to balance air-flow shall be provided with securely fixed minimum-position blocking devices to prevent restricting flow below the required volume or velocity.

**510.5.2 Emission control.** The design of the system shall be such that the emissions are confined to the area in which they are generated by air currents, hoods or enclosures and shall be exhausted by a duct system to a safe location or treated by removing contaminants.

**510.5.3 Hoods required.** Hoods or enclosures shall be used where contaminants originate in a limited area of a space. The design of the hood or enclosure shall be such that air currents created by the exhaust systems will capture the contaminants and transport them directly to the exhaust duct.

**510.5.4 Contaminant capture and dilution.** The velocity and circulation of air in work areas shall be such that contaminants are captured by an airstream at the area where the emissions are generated and conveyed into a product-conveying duct system. Contaminated air from work areas where hazardous contaminants are generated shall be diluted below the thresholds specified in Section 510.2 with air that does not contain other hazardous contaminants.

**510.5.5 Makeup air.** Makeup air shall be provided at a rate approximately equal to the rate that air is exhausted by the hazardous exhaust system. Makeup-air intakes shall be located so as to avoid recirculation of contaminated air.

**510.5.6 Clearances.** The minimum clearance between hoods and combustible construction shall be the clearance required by the duct system.

**510.5.7 Ducts.** Hazardous exhaust duct systems shall extend directly to the exterior of the building and shall not extend into or through ducts and plenums.

**510.6 Penetrations.** Penetrations of structural elements by a hazardous exhaust system shall conform to Sections 510.6.1 through 510.6.4.

**Exception:** Duct penetrations within H-5 occupancies as allowed by the *International Building Code*.

**510.6.1 Fire dampers.** Fire dampers are prohibited in hazardous exhaust ducts.

**510.6.2 Floors.** Hazardous exhaust systems that penetrate a floor/ceiling assembly shall be enclosed in a fire-resistance-rated shaft constructed in accordance with the *International Building Code*.

**510.6.3 Wall assemblies.** Hazardous exhaust duct systems that penetrate fire-resistance-rated wall assemblies shall be enclosed in fire-resistance-rated construction from the point of penetration to the outlet terminal, except where the interior of the duct is equipped with an approved automatic fire suppression system. Ducts shall be enclosed in accordance with the *International Building Code* requirements for shaft construction and such enclosure shall have a minimum fire-resistance-rating of not less than the highest fire-resistance-rated wall assembly penetrated.

**510.6.4 Fire walls.** Ducts shall not penetrate a fire wall.

**510.7 Suppression required.** Ducts shall be protected with an approved automatic fire suppression system installed in accordance with the *International Building Code*.

**Exceptions:**

1. An approved automatic fire suppression system shall not be required in ducts conveying materials, fumes, mists and vapors that are nonflammable and noncombustible under all conditions and at any concentrations.
2. An approved automatic fire suppression system shall not be required in ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).
3. For laboratories, as defined in Section 510.1, automatic fire protection systems shall not be required in laboratory hoods or exhaust systems.

**510.8 Duct construction.** Ducts utilized to convey hazardous exhaust shall be constructed of approved G90 galvanized sheet steel, with a minimum nominal thickness as specified in Table 510.8.

Nonmetallic ducts utilized in systems exhausting nonflammable corrosive fumes or vapors shall be listed and labeled. Nonmetallic duct shall have a flame spread index of 25 or less and a smoke-developed index of 50 or less, when tested in accordance with ASTM E 84. Ducts shall be approved for installation in such an exhaust system.

Where the products being exhausted are detrimental to the duct material, the ducts shall be constructed of alternative materials that are compatible with the exhaust.

**TABLE 510.8**  
**MINIMUM DUCT THICKNESS**

DIAMETER OF DUCT OR MAXIMUM SIDE DIMENSION	MINIMUM NOMINAL THICKNESS		
	Nonabrasive materials	Nonabrasive/Abrasive materials	Abrasive materials
0-8 inches	0.028 inch (No. 24 Gage)	0.034 inch (No. 22 Gage)	0.040 inch (No. 20 Gage)
9-18 inches	0.034 inch (No. 22 Gage)	0.040 inch (No. 20 Gage)	0.052 inch (No. 18 Gage)
19-30 inches	0.040 inch (No. 20 Gage)	0.052 inch (No. 18 Gage)	0.064 inch (No. 16 Gage)
Over 30 inches	0.052 inch (No. 18 Gage)	0.064 inch (No. 16 Gage)	0.079 inch (No. 14 Gage)

For SI: 1 inch = 25.4 mm.

**510.8.1 Duct joints.** Ducts shall be made tight with lap joints having a minimum lap of 1 inch (25 mm).

**510.8.2 Clearance to combustibles.** Ducts shall have a clearance to combustibles in accordance with Table 510.8.2. Exhaust gases having temperatures in excess of 600°F (316°C) shall be exhausted to a chimney in accordance with Section 511.2.

**TABLE 510.8.2**  
**CLEARANCE TO COMBUSTIBLES**

TYPE OF EXHAUST OR TEMPERATURE OF EXHAUST (°F)	CLEARANCE TO COMBUSTIBLES (inches)
Less than 100	1
100-600	12
Flammable vapors	6

For SI: 1 inch = 25.4 mm, °C = [(°F) - 32]/1.8.

**510.8.3 Explosion relief.** Systems exhausting potentially explosive mixtures shall be protected with an approved explosion relief system or by an approved explosion prevention system designed and installed in accordance with NFPA 69. An explosion relief system shall be designed to minimize the structural and mechanical damage resulting from an explosion or deflagration within the exhaust system. An explosion prevention system shall be designed to prevent an explosion or deflagration from occurring.

**510.9 Supports.** Ducts shall be supported at intervals not exceeding 10 feet (3048 mm). Supports shall be constructed of noncombustible material.

## SECTION 511 DUST, STOCK AND REFUSE CONVEYING SYSTEMS

**511.1 Dust, stock and refuse conveying systems.** Dust, stock and refuse conveying systems shall comply with the provisions of Section 510 and Sections 511.1.1 through 511.2.

**511.1.1 Collectors and separators.** Collectors and separators involving such systems as centrifugal separators, bag filter systems and similar devices, and associated supports shall be constructed of noncombustible materials and shall be located on the exterior of the building or structure. A collector or separator shall not be located nearer than 10 feet (3048 mm) to combustible construction or to an unprotected wall or floor opening, unless the collector is provided with a metal vent pipe that extends above the highest part of any roof with a distance of 30 feet (9144 mm).

### Exceptions:

1. Collectors such as "Point of Use" collectors, close extraction weld fume collectors, spray finishing booths, stationary grinding tables, sanding booths, and integrated or machine-mounted collectors shall be permitted to be installed indoors provided the installation is in accordance with the *International Fire Code* and the *ICC Electrical Code*.
2. Collectors in independent exhaust systems handling combustible dusts shall be permitted to be installed indoors provided that such collectors are installed in compliance with the *International Fire Code* and the *ICC Electrical Code*.

**511.1.2 Discharge pipe.** Discharge piping shall conform to the requirements for ducts, including clearances required for high-heat appliances, as contained in this code. A delivery pipe from a cyclone collector shall not convey refuse directly into the firebox of a boiler, furnace, dutch oven, refuse burner, incinerator or other appliance.

**511.1.3 Conveying systems exhaust discharge.** An exhaust system shall discharge to the outside of the building either directly by flue or indirectly through the bin or vault into which the system discharges except where the contaminants have been removed. Exhaust system discharge shall be permitted to be recirculated provided that the solid particulate has been removed at a minimum efficiency of 99.9 percent at 10 microns, vapor concentrations are less than 25 percent of the LFL, and approved equipment is used to monitor the vapor concentration.

**511.1.4 Spark protection.** The outlet of an open-air exhaust terminal shall be protected with an approved metal or other noncombustible screen to prevent the entry of sparks.

**511.1.5 Explosion relief vents.** A safety or explosion relief vent shall be provided on all systems that convey combustible refuse or stock of an explosive nature, in accordance with the requirements of the *International Building Code*.

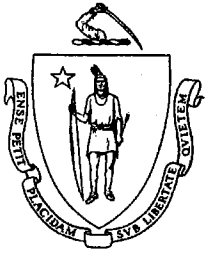
**511.1.5.1 Screens.** Where a screen is installed in a safety relief vent, the screen shall be attached so as to permit ready release under the explosion pressure.

Massachusetts Department of Public Safety  
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November 6, 2007

**Submitted Public Comments**

Chapters 13

Proposed by Northeast Energy Efficiency Partnership, Inc



Deval Patrick  
Governor

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Lieutenant Governor

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Secretary

# The Commonwealth of Massachusetts

## Department of Public Safety

Board of Building Regulations and Standards

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### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	Chapter 13	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

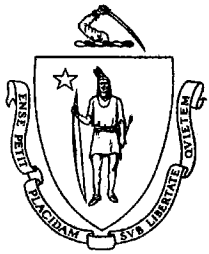
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| <input type="checkbox"/> Add new section as follows           | <input type="checkbox"/> Delete section - no substitute           |

#### Text of Proposed Amendment::

(AMD) **U-Factor:** Substitute the term 'U-factor' for the term 'U-value' wherever it occurs in the document. This can easily be accomplished through a word search of the document.

#### Supporting Statements: Include supplementary material - use additional sheets if necessary

The term 'U-factor' is the accepted nomenclature for the thermal transmittance of materials and assemblies; designated so as to avoid confusion with thermal resistance: 'R-value.'



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Vice Chairman

### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	2 November 2007	Date Received:	
Code Section:	1301.1	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

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|---|---|
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| <input type="checkbox"/> Add new section as follows           | <input type="checkbox"/> Delete section - no substitute           |

#### Text of Proposed Amendment::

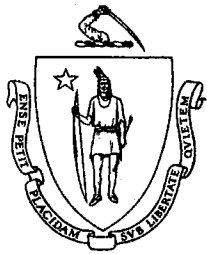
(AMD) **1301.1 Scope:** 780 CMR 13 sets forth requirements for the effective use of energy for human comfort in structures other than One and Two-family Dwellings, Townhouses, and *low rise residential buildings*. which All low-rise residential structures shall be designed and constructed to comply with the requirements of 780 CMR Chapter 61 (refer to the 7<sup>th</sup> Edition Massachusetts Building Code for One- and Two-Family Dwellings, Section 6101.3, Note 1)

(Exception unchanged)

#### Supporting Statements: Include supplementary material - use additional sheets if necessary

The requirement for compliance of all residential low-rise buildings located in the One and Two-Family Dwelling Code (IRC) is contrary to the model code IECC 2003; the alternative standard ASHRAE 90.2 upon which this compliance requirement is based is not familiar to most code officials, and is not a listed alternative compliance option.

This recommended change will serve to clarify how and where multi-family residential that is NOT high-rise may be found within the overall 780 CMR code divisions.



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### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	1301.7	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

- ☒ Change Section as follows      ☐ Delete section and substitute as follows  
☐ Add new section as follows      ☐ Delete section - no substitute

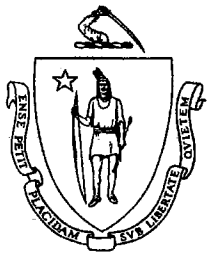
#### Text of Proposed Amendment::

(AMD) **1301.7 Exempt buildings:** The following buildings are exempt from the further provisions of 780 CMR 13, with the exception of 780 CMR 1308.0 dealing with lighting requirements:

1. Buildings and structures or portions thereof whose peak design rate of energy usage is less than one watt per square foot or three and four tenths (3.4) Btu/h per square foot of floor area for all purposes;
2. Buildings and structures or portions thereof which are neither heated nor cooled;
3. *Greenhouses* that are free-standing, or attached to a building and separated by a wall having the same thermal value as an exterior wall, ~~and provided with a separate temperature control system~~ having less than 1W/sf of energy usage for space-conditioning purposes;
4. Buildings with less than 100 square feet of gross floor area.
5. Portions of aircraft hangars where aircraft are housed or stored and/or aircraft servicing, repairs or alterations ~~may occur;~~ utilizing less than 1W/sf of energy usage for space-conditioning purposes. ~~Such hangars are also exempt from the lighting requirements of 780 CMR 1308.~~

#### Supporting Statements: Include supplementary material - use additional sheets if necessary

There is no requirement for openings in the wall, no requirement for maximum size of the greenhouse, no requirement for a separate heating system. It is not possible to estimate the energy waste if the spaces are used for habitable/occupiable purposes, other than it would be significant and unregulated. The suggested amendments are language in the model code. Hanger lighting must comply with Table 1308.6.2.2.



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### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	1304.2.2	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

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| <input type="checkbox"/> Add new section as follows | <input type="checkbox"/> Delete section - no substitute                      |

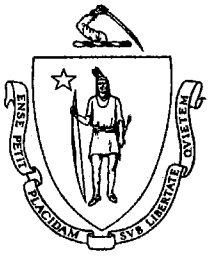
#### Text of Proposed Amendment::

(AMD) 1304.2.2 Non-glazed doors: ~~When the total area of non-glazed doors is greater than 5% of the total opaque wall area, the area of non-glazed doors above 5% shall be insulated as an opaque wall or an adjustment shall be made in the thermal resistance of the wall to address any thermal deficiency created by the doors.~~ Nonglazed doors shall meet the applicable requirements for windows and glazed doors and be considered as part of the gross area of the above-grade walls that are part of the building envelope.

#### Supporting Statements: Include supplementary material - use additional sheets if necessary

The proposed language allows unregulated opaque doors (particularly overhead doors without limitation as to number) up to 5% of the total gross above-grade wall area which, in warehouses and moderate to large buildings, can be a significant energy loss. For example, a 20,000sf conditioned 20' clear height warehouse could have at least 6 truck loading doors with no minimum U-factor requirements.

There is no reason why the specific model code language should not be utilized for saving energy in this specific envelope requirement.



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### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	2 November 2007	Date Received:	
Code Section:	Tables 1304.2.(3-12)	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

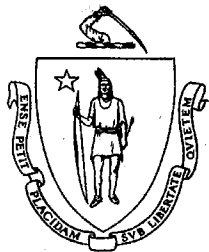
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| <input type="checkbox"/> Add new section as follows           | <input type="checkbox"/> Delete section - no substitute           |

#### Text of Proposed Amendment::

(AMD) Tables 1304.2.3/4/7/8/10/11/12 **Building Envelope Requirements:** Under each Slab, Perimeter and Below-Grade Wall category in the above referenced tables, delete R-5 and substitute R-8.

#### Supporting Statements: Include supplementary material - use additional sheets if necessary

The minimum required Slab, Perimeter and Below-Grade Wall insulation R-value in all seven of these tables, taken from the IECC 1998, 2000 and 2003 model code editions, is R-8. The R-5 value has not been the minimum requirement in energy codes since the 1995 Model Energy Code published by the Council of American Building Officials. Use of R-8 minimum perimeter/slab insulation will substantially improve energy performance with only slight increases in cost, since the labor to install this feature is the principal cost, and does not vary with the thickness change from R-5 to R-8.



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#### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	1305.2.3	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

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 ☐ Delete section and substitute as follows  
☐ Add new section as follows
 ☐ Delete section - no substitute

#### Text of Proposed Amendment::

(AMD) **1305.2.3 HVAC equipment performance requirements:** ~~Packaged air conditioners and heat pumps with capacity greater than 240,000 Btu/h, ground source and ground water source heat pumps, and duct furnaces and unit heaters~~ Equipment shall meet the minimum efficiency requirements of Tables 1305.3.3a, b, and d, 1305.3.3(1) through (11) when tested and rated in accordance with the referenced test procedure. The efficiency shall be verified through data furnished by the manufacturer or through certification under an approved certification program. Where multiple rating conditions and/or performance requirements are provided, the equipment shall satisfy all stated requirements.

Other new equipment within the scope of 1305.2 ~~is required to~~ shall meet applicable efficiency standards administered by the federal government. The efficiency of used equipment within the scope of the federal standards shall be verified through data furnished by the manufacturer to the code official.

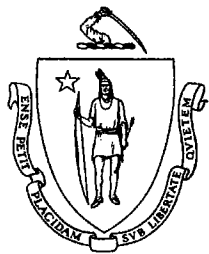
Equipment not required to meet these efficiency standards or those administered by the federal government, ~~and not in Tables 1305.3.3a, b, and d~~ ~~may~~ shall be allowed to be used, and have no but shall meet all other minimum performance requirements as set forth herein.

**Supporting Statements: Include supplementary material - use additional sheets if necessary**

Packaged air conditioning and heat pumps less than 240,000 Btu/hr are NOT excluded from compliance with minimum Federal efficiency standards; the exemption is contrary to Federal law and unenforceable.

The laundry list of equipment types is unnecessary and incomplete. The table references are incorrect.

The proposed changes will eliminate any confusion about the scope of the section. Nowhere in any model code is used equipment allowed to be used without it being "...for the purpose intended, at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety."



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#### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	1305.2.8	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

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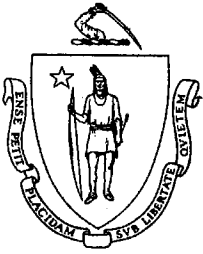
#### Text of Proposed Amendment::

(AMD) **1305.2.8 Duct and plenum insulation and sealing:** All supply and return air ducts and plenums shall be insulated with a minimum of R-5 insulation when located in *unconditioned spaces* and with a minimum of R-8 insulation when located outside the building envelope. When located within a building envelope assembly the duct or plenum shall be separated from the building exterior ~~or unconditioned or exempt spaces~~ by a minimum ~~R-5~~ R-8 insulation. Required R-values are the "labeled" R-values for such ducts. *(remainder of section unchanged)*

#### Supporting Statements: Include supplementary material - use additional sheets if necessary

Ducts within exterior walls must be insulated to the same R-value (R-8) as the exterior wall envelope, but only on the sides that directly abut the exterior skin; the other sides of the duct must be insulated to R-5 minimum for unconditioned space. The exterior duct face does not derive any significant additional insulation value from the exterior sheathing.

This requirement was adopted into the model code in 2000 to correlate with the ASHRAE 90.1-1999 minimum requirements



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### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	2 November 2007	Date Received:	
Code Section:	1305.3.4.1	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

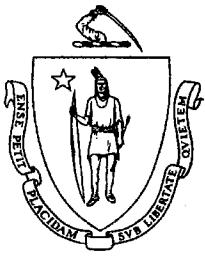
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#### Text of Proposed Amendment::

(AMD) **1305.3.4.1 Thermostatic controls:** The supply of heating and cooling energy to each zone shall be individually controlled by thermostatic controls capable of responding to temperature within the zone. Where humidification or dehumidification or both is provided, at least one humidity control device shall be provided for each humidity control system. (remainder of section unchanged)

#### Supporting Statements: Include supplementary material - use additional sheets if necessary

The title of the section is "Temperature and Humidity Control ." The proposed amendment is language straight out of the model code section. The text needs to be consistent. Major discomfort to occupants can occur without control of humidification; it is not possible here to predict to what extent uncontrolled latent conditions will negatively affect the cooling capacity of any specific system.



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Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	1305.3.4.1.1	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

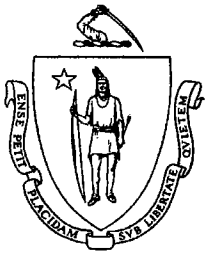
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#### Text of Proposed Amendment::

(ADD) **1305.3.4.1.1 Heat Pump Supplementary Heat:** Heat pumps having supplementary electric resistance heat shall have controls that, except during defrost, prevent supplementary heat operation when the heat pump can meet the heating load.

#### Supporting Statements: Include supplementary material - use additional sheets if necessary

The lack of this model code subsection will allow a heat pump that operates the compressor and the electric resistance heat simultaneously, thereby using more electrical power than required to efficiently handle the load and thereby wasting energy.



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Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	1305.3.7	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

- ☒ Change Section as follows
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#### Text of Proposed Amendment::

(AMD) **1305.3.7 Economizers:** Each cooling system with a total capacity of at least ~~65,000~~ 54,000 Btu/hr including the fan shall have an air or water economizer.

Cooling fan systems ~~with a total cooling capacity less than 65,000 Btu/hr~~ shall have an air or water economizer ~~in buildings 3 stories and taller~~ where the total cooling capacity of all such systems serving a single room or space exceeds ~~2,400,000~~ 135,000 Btu/hr ~~or 10% of the total installed cooling capacity, whichever is larger.~~

#### Exceptions:

1. Systems that include gas phase air cleaning in order to meet ventilation requirements.
2. Where more than 25% of the air designed to be supplied by the system is to spaces that are designed to be humidified above a 35°F (2°C) dewpoint temperature in order to satisfy process needs.
3. Systems that include a condenser heat recovery system complying with 1305.3.12
4. Systems that serve residential spaces where the system capacity is less than ~~325,000 cfm~~ 675,000 Btuh
5. Systems that serve spaces whose sensible cooling load at design conditions, excluding transmission and infiltration loads, is less than or equal to transmission and infiltration losses at an outdoor temperature of 60°F.
6. Systems expected to operate less than 20 hours per week.
7. Where the use of outdoor air for cooling will affect supermarket open refrigerated casework systems.

**Supporting Statements: Include supplementary material - use additional sheets if necessary**

Equipment rated less than 65,000 Btu/hr using economizers is commonly available. The current threshold in model codes is 54,000 Btu/hr. as proposed in this change.

The proposed MA code language also contains unnecessary exemption for total economizers utilized in smaller units (<65,000 Btu/h) for:

- 1) All buildings less than three stories in height; and
- 2) The same exemption for taller building with less than 200 tons of cooling in the aggregate.

These are both enormous loopholes and a significant waste of free energy. A study by Cool Choice in 2002 found that, for Boston, a typical, moderate size (30-ton) retail or office air-conditioning system could save an average 23% of normal energy use when equipped with an economizer; about 370kW/ton. Using a basic economizer, about 16% energy can be saved; when using differential enthalpy equipment and control, this could be almost 33% savings.

Proposed code text diminishes a basic energy-savings requirement for the use of outdoor air for cooling. There is no justification for allowing relaxation of a requirement existing in model codes since 2000.

The exception for residential spaces with less than 675,000 Btu/h is an ASHRAE requirement that appears to have been misinterpreted here – the value is 5 times the listed equipment requirement. This is an energy standard rather than a ventilation standard.

The change in the text of the second paragraph is text taken from the IECC 2006 without edit.

Recommend that provisions in IECC 2006 Section 503.3.1 and ASHRAE 90.1-2004 be substituted as

Assumptions: Nominal 30 ton cooling load, 8.2 EER unit serving one core and two perimeter zones

Space Use	Control Type	Annual Usage	Bangor ME	Portland ME	Burlington VT	Concord NH	Hartford CT	Boston MA	LaGuardia AP, NY	Phil. PA	Newark NJ	Lakehurst NJ	Wilmington DE	Average
Office	No	Ton-Hrs	24568	23067	25923	25989	29730	27750	31154	36040	34466	34898	36701	30026
	Economizer	kWh	35453	34388	40479	39713	43795	41217	46765	54218	50565	51513	53092	44654
	Dry	Ton-Hrs	22064	20841	24079	24140	28024	25389	29146	34195	32367	32749	34830	27984
	Bulb	kWh	31356	30774	37429	36656	40986	37359	43445	51172	47109	47970	50011	41297
	Enthalpy	Ton-Hrs	19025	17923	21263	21307	25061	21871	25984	31179	29613	30292	32327	25077
		kWh	26867	26296	32767	32055	36400	31952	38430	46295	42773	44077	46095	36728
	Differential	Ton-Hrs	13912	12669	17108	17178	20842	17412	21418	26374	24563	25632	27581	20426
	Enthalpy	kWh	18634	18676	26127	25640	30220	25479	31637	38942	35474	36903	38904	29694
	No Econ. to Dry Bulb													
	Maximum Cooling Tons		26	25	32	32	29	27	26	32	29	31	30	29.0
Office	Annual kWh Savings		4097	3614	3050	3057	2809	3858	3320	3046	3456	3543	3081	3357
	% Savings		11.6%	10.5%	7.5%	7.7%	6.4%	9.4%	7.1%	5.6%	6.8%	6.9%	5.8%	7.5%
	kWh Savings / ton		158	145	95	96	97	143	128	95	119	114	103	116
	Dry Bulb to Diff. Enthalpy													
	Maximum Cooling Tons		26	25	32	32	29	27	26	32	29	31	30	29.0
	Annual kWh Savings		12722	12098	11302	11016	10766	11880	11808	12230	11635	11067	11107	11603
	% Savings		40.6%	39.3%	30.2%	30.1%	26.3%	31.8%	27.2%	23.9%	24.7%	23.1%	22.2%	28.1%
	kWh Savings / ton		489	484	353	344	371	440	454	382	401	367	370	400
	Enthalpy to Diff. Enthalpy													
	Maximum Cooling Tons		26	25	32	32	29	27	26	32	29	31	30	29.0
Retail	Annual kWh Savings		8233	7620	6640	6415	6180	6473	6793	7353	7299	7174	7191	7034
	% Savings		30.6%	29.0%	20.3%	20.0%	17.0%	20.3%	17.7%	15.9%	17.1%	16.3%	15.6%	19.2%
	kWh Savings / ton		317	305	208	200	213	240	261	230	252	231	240	243
	No	Ton-Hrs	33078	32207	35044	35080	39437	37377	41677	46980	45383	45609	47339	39928
	Economizer	kWh	46955	46921	53567	52530	56716	54266	61155	69254	65068	66193	67100	58157
	Dry	Ton-Hrs	27908	27197	30948	30982	35310	32100	37039	42679	40667	40970	42987	35344
	Bulb	kWh	38501	38727	46797	45766	49930	45629	53503	62155	57300	58548	59940	50618
	Enthalpy	Ton-Hrs	23685	23663	27244	27274	31507	27455	32743	38850	36815	37555	39398	31472
		kWh	32514	33489	40846	39947	44300	38700	46939	56185	51471	53226	54552	44743
	Differential	Ton-Hrs	16585	17061	21631	21639	26297	21632	27030	32805	30670	31563	33456	25488
Retail	Enthalpy	kWh	22900	24322	32205	31514	36899	30624	38818	47240	43029	44400	46124	36189
	No Econ. to Dry Bulb													
	Maximum Cooling Tons		30	26	32	32	28	28	27	32	30	31	29	29.5
	Annual kWh Savings		8454	8194	6770	6764	6786	8637	7652	7099	7768	7645	7160	7539
	% Savings		18.0%	17.5%	12.6%	12.9%	12.0%	15.9%	12.5%	10.3%	11.9%	11.5%	10.7%	13.0%
	kWh Savings / ton		282	315	212	211	242	308	283	222	259	247	247	255
	Dry Bulb to Diff. Enthalpy													
	Maximum Cooling Tons		30	26	32	32	28	28	27	32	30	31	29	29.5
	Annual kWh Savings		15601	14405	14592	14252	13031	15005	14685	14915	14271	14148	13816	14429
	% Savings		40.5%	37.2%	31.2%	31.1%	26.1%	32.9%	27.4%	24.0%	24.9%	24.2%	23.0%	28.5%
Retail	kWh Savings / ton		520	554	456	445	465	536	544	466	476	456	476	488
	Enthalpy to Diff. Enthalpy													
	Maximum Cooling Tons		30	26	32	32	28	28	27	32	30	31	29	29.5
	Annual kWh Savings		9614	9167	8641	8433	7401	8076	8121	8945	8442	8826	8428	8554.0
	% Savings		29.6%	27.4%	21.2%	21.1%	16.7%	20.9%	17.3%	15.9%	16.4%	16.6%	15.4%	19.1%
	kWh Savings / ton		320	353	270	264	264	288	301	280	281	285	291	290
	Enthalpy to Diff. Enthalpy													
	Maximum Cooling Tons		30	26	32	32	28	28	27	32	30	31	29	29.5
	Annual kWh Savings		9614	9167	8641	8433	7401	8076	8121	8945	8442	8826	8428	8554.0
	% Savings		29.6%	27.4%	21.2%	21.1%	16.7%	20.9%	17.3%	15.9%	16.4%	16.6%	15.4%	19.1%
Retail	kWh Savings / ton		320	353	270	264	264	288	301	280	281	285	291	290



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Timothy Murray  
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Secretary

# The Commonwealth of Massachusetts

## Department of Public Safety

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Vice Chairman

### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	1306.6.2	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Change Section as follows | <input type="checkbox"/> Delete section and substitute as follows |
| <input type="checkbox"/> Add new section as follows           | <input type="checkbox"/> Delete section - no substitute           |

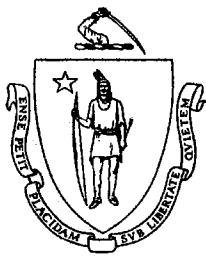
#### Text of Proposed Amendment::

(AMD) **1306.6.2 Pool Heaters:** Pool heaters shall meet the ASHRAE 146 standard and the efficiency requirements for boilers. Pool heaters fired by natural gas or propane (LPG) shall not have continuously burning pilot lights.

#### Supporting Statements: Include supplementary material - use additional sheets if necessary

The requirement for intermittent ignition in place of a standing pilot light for all gas appliances increases energy conservation and levels the playing field between the two fuels.

Pool heater requirements should be based upon a recognized national standard, and the reference included in Chapter 35 (see corresponding Code Change ASHRAE, CHAPTER 35).



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### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	1308.2.4	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

- ☒ Change Section as follows      ☐ Delete section and substitute as follows  
☐ Add new section as follows      ☐ Delete section - no substitute

#### Text of Proposed Amendment::

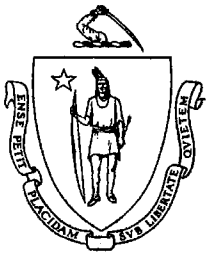
(AMD) 1308.2.4. Additional Control:

1. Display/Accent Lighting - display or accent lighting shall have a separate *control device*.
2. Case Lighting - lighting in cases used for display purposes shall be equipped with a separate *control device*.
3. Hotel and Motel Guest Room Lighting - hotel and motel guest rooms and guest suites shall have a master *control device* at the main room entry that *controls* all *permanently installed luminaires* and switched receptacles, except those in the bathrooms.

(remaining three conditions unchanged)

**Supporting Statements: Include supplementary material - use additional sheets if necessary**

IECC 2006 recognizes that the bathroom light exception is needed because the space is required to have a privacy lock, and a master switch that overrides the bathroom illumination creates a potentially unsafe condition if the space is occupied.



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### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	1308.4	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

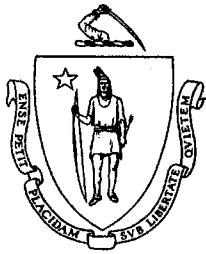
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| <input type="checkbox"/> Add new section as follows           | <input type="checkbox"/> Delete section - no substitute           |

#### Text of Proposed Amendment::

(AMD) **1308.4. Exit Signs:** ~~Exit sign luminaires operating at greater than 20 watts shall have a minimum source efficacy of 35 lm/W.~~ Internally illuminated exit signs shall not exceed 5 watts per side.

#### Supporting Statements: Include supplementary material - use additional sheets if necessary

IECC 805.4 and Massachusetts General Law state that the internal illumination wattage cannot exceed 5 watts per side maximum.



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### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	1309.3	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Change Section as follows | <input type="checkbox"/> Delete section and substitute as follows |
| <input type="checkbox"/> Add new section as follows           | <input type="checkbox"/> Delete section - no substitute           |

#### Text of Proposed Amendment::

AMD) **1309.3 Proposed Design:** Building systems and loads shall be simulated in the proposed design as follows:

1. HVAC and Service Water Heating Equipment: All HVAC and Service Water Heating Equipment shall be simulated in the proposed design using capacities, rated efficiencies, and part-load performance data for the proposed equipment as provided by the equipment manufacturer.
2. Features Not Documented at Time of Permit: Any feature of the proposed design not included in the construction documents shall be assumed to be equal equivalent to the corresponding feature in the standard design.

**Supporting Statements: Include supplementary material - use additional sheets if necessary**

Packaged air conditioning and heat pumps less than 240,000 Btu/hr are NOT excluded from compliance with minimum Federal efficiency standards; the exemption is contrary to Federal law and unenforceable.

The laundry list of equipment types is unnecessary and incomplete. The table references are incorrect.

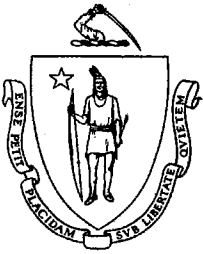
The proposed changes will eliminate any confusion about the scope of the section. Nowhere in any model code is used equipment allowed to be used without it being "...for the purpose intended, at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety."

Massachusetts Department of Public Safety  
Public Hearing on State Building Code 7<sup>th</sup> Edition  
November 6, 2007

**Submitted Public Comments**

Chapters 35

Proposed by Northeast Energy Efficiency Partnership, Inc



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Timothy Murray  
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Kevin Burke  
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#### MASSACHUSETTS STATE BUILDING CODE - CODE AMENDMENT PROPOSAL

Please Print		State Use Only	
Date:	5 November 2007	Date Received:	
Code Section:	CHAPTER 35	Code Change Number::	
Proponent: Donald J. Vigneau, A.I.A., Northeast Energy Efficiency Partnerships, Inc.			
Address: 5 Militia Drive Lexington, MA 02421			
Telephone: [781] 860-9177 Ext.20		Fax:: [781] 860-9178	

#### Check type of amendment proposed

- |  |   |
|--|---|
| <input type="checkbox"/> Change Section as follows             | <input type="checkbox"/> Delete section and substitute as follows |
| <input checked="" type="checkbox"/> Add new section as follows | <input type="checkbox"/> Delete section - no substitute           |

#### Text of Proposed Amendment::

(ADD) <b>ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.</b>		
<u>Standard Ref#</u>	<u>Title</u>	<u>Code Reference</u>
119-88(RA 1994)	Air Leakage Performance for Single-Family Residential Buildings	Chapter 61
146-1998	Testing and Rating Pool Heaters	Chapters 13&61
1326-1 (2004)	Water-Source heat Pumps – Testing and Rating for Performance -	
	Part 1: Water to Air and Brine-to-Air Heat Pumps ASHRAE 90.1-2004	Chapter 13
90.1-2004*	Energy Standard for Buildings Except Low-Rise Residential Buildings	
	(*including adopted Addenda a through av)	Chapter 13
ASHRAE 2005	ASHRAE Handbook of Fundamentals – 2005	Chapter 13
ASHRAE 2004	ASHRAE HVAC Systems and Equipment Handbook – 2004	Chapter 13

**Supporting Statements: Include supplementary material - use additional sheets if necessary**

Nowhere in Chapter 35 or the various Appendices can a listing of the references to ASHRAE in various portions of the 7<sup>th</sup> Edition be found. These referenced documents must be located in Chapter 35 so that the applicable editions of the standards can be known to the designers and enforcers.

There are 4 citations for Fundamentals-1997, 22 for 2005, and 1 with no edition called out. References to 90.1 are to the 2004 edition. Citations within the proposed code text need to have edition references deleted so that Chapter 35 provides all direction for edition references.

Reference is made in Code Change 'Chapter 35' text to ASHRAE 146-1998 standard.

References to AAMA, NFRC and other standards referenced in Chapter 13 are similarly lacking, and will be identified in another change proposal.

Massachusetts Department of Public Safety  
Public Hearing on State Building Code 7<sup>th</sup> Edition  
November 6, 2007

## **Submitted Public Comments**

Chapter 53 (1 & 2 Family)

Proposed by Wanda D. Edwards, PE

**Edwards, Wanda**

**From:** Larry Franks [LFranks@iccsafe.org]  
**Sent:** Tuesday, September 11, 2007 9:50 AM  
**To:** Edwards, Wanda; Alan Carr  
**Cc:** Dave Bowman; Marc Nard; Reinhold, Tim  
**Subject:** RE: interpretation - wind maps

In determining the Basic Wind Speed, for Hyannis, Massachusetts, from Figure R301.2 (4) of the IRC, note c does not apply.  
 You must interpolate or use 120mph.

This opinion is based on the information which you have provided. We have made no independent effort to verify accuracy of this information nor have we conducted a review beyond the scope of your question. As this opinion is advisory, the final decision is the responsibility of the designated authority charged with the administrative enforcement of this code.

Larry D. Franks, PE, CBO  
 Senior Staff Engineer  
 Codes and Standards Development  
 International Code Council, Inc.  
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 Birmingham, AL 35213  
 888-ICC-SAFE (422-7233) x5279 phone  
 205-592-7001 facsimile  
 lfranks@iccsafe.org  
 www.iccsafe.org

**From:** Edwards, Wanda [mailto:wedwards@ibhs.org]  
**Sent:** Tuesday, September 11, 2007 7:56 AM  
**To:** Larry Franks; Alan Carr  
**Cc:** Dave Bowman; Marc Nard; Reinhold, Tim  
**Subject:** RE: interpretation - wind maps

I agree interpolation is best, but most inspection departments do not use interpolation for the residential code. It makes enforcement too difficult. So given that they don't interpolate, and based upon the ASCE commentary, I would say they would have to use 120 versus 110. If the wind speed in Hyannis is 117 and they use 110, they are underdesigned. Correct?

Wanda D. Edwards, PE  
 Director of Building Code Development  
 Institute for Business and Home Safety  
 919/761-8863

**From:** Larry Franks [mailto:LFranks@iccsafe.org]  
**Sent:** Monday, September 10, 2007 3:01 PM  
**To:** Alan Carr; Edwards, Wanda

11/6/2007

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**Cc:** Dave Bowman; Marc Nard  
**Subject:** RE: interpretation - wind maps

I agree that interpolation should be used.  
 This is confirmed by referring to ASCE 7-05 commentary for Section 6.5.4.  
 Attached is an excerpt of the ASCE commentary which shows Basic Wind Speed from Figure 6.1 to be 117 mph for Hyannis, Massachusetts.

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**From:** Alan Carr  
**Sent:** Thursday, August 23, 2007 4:44 PM  
**To:** 'Edwards, Wanda'  
**Cc:** Larry Franks; Dave Bowman; Marc Nard  
**Subject:** RE: interpretation - wind maps

Wanda,

Interesting question. I am copying Larry Franks & Marc Nard as they have the IRC committee and may have heard some discussions related to you question.

My feeling is this – note “b” permits interpolation between contours. Interpolation instead of what? It must be in lieu of going to the next higher contour. Note c applies outside the last contour – no interpolation is possible. Now I see from the way that the contours run – particularly 120 mph dead ending – that interpolation may be trickier in this area, but I think it can be done. I would suggest interpolating or taking the next higher contour value of 120 mph. If somebody [on the ASCE 7 wind committee] thought that the appropriate wind speed for these areas was 110 mph, then I would have expected the 120 mph contour to dead end West of the islands – maybe in the vicinity of the Conn-Mass border for instance. Hope this helps.

Regards,

Alan Carr

**From:** Edwards, Wanda [mailto:wedwards@ibhs.org]  
**Sent:** Wednesday, August 08, 2007 11:49 AM  
**To:** Alan Carr  
**Subject:** interpretation - wind maps

Hi Alan,  
 Hope you can help with this or direct me to someone who can. Massachusetts has appointed a task force to study the design wind speeds for the state. I am attaching the ASCE map which seems consistent with the IRC. The task force has recommended to the state that the design wind speed for the cape and the islands off the cape should be 110 mph. the design wind speed is currently 120 mph. I think it should be 120 mph because using interpolation the wind speed on the cape would exceed 110 mph, so you round up to 120 mph rather than round

11/6/2007

Al

down to 110 mph.

Massachusetts feels they exceed the code at 120 mph and will be consistent with the IRC at 110 mph. They are basing their decision on the footnote that appears in the code under figure R301.2(4)  
"c. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area."

Can you shed any light on this? According to the code, should the wind speed be 110 or 120.

Wanda D. Edwards, PE  
Director of Building Code Development  
Institute for Business and Home Safety  
919/761-8863

11/6/2007

A2

(round to 1.5). Of the uncertainties affecting the wind load factor, the variability in wind speed has the strongest influence [Ref. C6-11], such that changes in the coefficient of variation in all other factors by 25 percent gives less than a 5 percent change in load factor. The nonhurricane multiplier of 50-year wind speed for various return periods averages  $F_c = 0.36 + 0.1 \ln(127)$ , with  $T$  in years [Ref. C6-12]. Setting  $F_c = \sqrt{F} = \sqrt{1.5} = 1.225$  yields  $T = 476$  yr. On this basis, a roughly 500-yr speed might reasonably represent an approximate ultimate limit state event. However, the use of a strength design load factor of 1.6 (Section 2.3.2) in this standard causes the actual strength design return period to be slightly higher.

A set of design-level hurricane speed contours, which include the hurricane importance factor, were obtained by dividing 500-yr hurricane wind speed contours by  $\sqrt{F} = 1.225$ . Essentially the same map would be obtained by dividing a map for slightly higher recurrence interval by  $\sqrt{1.6}$ . The implied hurricane importance factor ranges from near 1.0 up to about 1.25 (the explicit value in ASCE 7-93 was 1.05).

The design-level speed map has several advantages. First, a design using the map results in an ultimate load (loads inducing the design strength after use of the load factor) that has a more uniform risk for buildings than occurred with earlier versions of the map. Second, there is no need for a designer to use and interpolate a hurricane coast importance factor. It is not likely that the 500-yr event is the actual speed at which engineered structures are expected to fail, due to resistance factors in materials, due to conservative design procedures that do not always analyze all load capacity, and due to a lack of a precise definition of "failure."

The wind speed map of Fig. 6-1 presents basic wind speeds for the contiguous United States, Alaska, and other selected locations. The wind speeds correspond to 3-s gust speeds at 33 ft (10 m) above ground for exposure category C. Because the National Weather Service (NWS) has phased out the measurement of fastest-mile wind speeds, the basic wind speed has been redefined as the peak gust that is recorded and archived for most NWS stations. Given the response characteristics of the instrumentation used, the peak gust is associated with an averaging time of approximately 3 s. Because the wind speeds of Fig. 6-1 reflect conditions at airports and similar open-country exposures, they do not account for the effects of significant topographic features such as those described in Section 6.5.7. Note that the wind speeds shown in Fig. 6-1 are not representative of speeds at which ultimate limit states are expected to occur. Allowable stresses or load factors used in the design equation(s) lead to structural resistances and corresponding wind loads and speeds that are substantially higher than the speeds shown in Fig. 6-1.

The hurricane wind speeds given in Fig. 6-1 replace those given in ASCE 7-95 that were based on a combination of the data given in [Refs. C6-8, C6-13, C6-14, C6-15, C6-16], supplemented with some judgment. The nonhurricane wind speeds of Fig. 6-1 were prepared from peak gust data collected at 485 weather stations where at least 5 yr of data were available [Refs. C6-12, C6-17, C6-18]. For nonhurricane regions, measured gust data were assembled from a number of stations in state-sized areas to decrease sampling error, and the assembled data were fit using a Fisher-Tippett Type I extreme value distribution. This procedure gives the same speed as does area-averaging the 50-year speeds from the set of stations. There was insufficient variation in 50-yr speeds over the eastern three-quarters of the lower 48 states to justify contours. The division between the 90 and 85 mi/h (40.2 and 38.0 m/s) regions, which follows state lines, was sufficiently close to the 85 mi/h (38.0 m/s) contour that there was no statistical basis for placing the division off political boundaries.

This data is expected to follow the gust factor curve of Fig. C6-4 [Ref. C6-19].

Limited data were available on the Washington and Oregon coast. In this region, existing fastest-mile wind speed data were converted to peak gust speeds using open-country gust factors [Ref. C6-19]. This limited data indicates that a speed of 100 mi/h is appropriate in some portions of the special coastal region in Washington and 90 mi/h in the special coastal region in Oregon. These speeds do not include that portion of the special wind region in the Columbia River Gorge where higher speeds may be justified. Speeds in the Aleutian Islands and in the interior of Alaska were established from gust data. Contours in Alaska are modified slightly from ASCE 7-88 based on measured data, but insufficient data were available for a detailed coverage of the mountainous regions. Gust data in Alaska were not corrected for potential terrain influence. It is possible that wind speeds in parts of Alaska would reduce if a study were made to determine the topographic wind speed-up effect on recorded wind speeds.

**Correlation of Basic Wind Speed Map with the Saffir/Simpson Scale.** Hurricane intensities are reported by the National Hurricane Center according to the Saffir/Simpson Hurricane Scale [Refs. C6-20, C6-21] shown in Table C6-1. This scale has found broad usage by hurricane forecasters, local and federal agencies responsible for short-range evacuation of residents during hurricane alerts, as well as long-range disaster planning and the news media. The scale contains five categories of hurricanes and distinguishes them based on wind speed intensity, barometric pressure at the center of the storm, and estimated storm surge and damage potential. Wind speed is the determining factor used in categorizing the hurricane.

The wind speeds used in the Saffir/Simpson Hurricane Scale are defined in terms of a sustained wind speed with a 1-min averaging time at 33 ft (10 m) over open water. The ASCE 7 standard by comparison uses a 3-s gust speed at 33 ft (10 m) above ground in Exposure C (defined as the Basic Wind Speed, and shown in the wind speed map, Fig. 6-1). An approximate relationship between the wind speeds in ASCE 7 and the Saffir/Simpson scale is shown in Table C6-2. The table provides the sustained wind speeds of the Saffir/Simpson scale over water, equivalent intensity gust wind speeds over water, and equivalent intensity gust wind speeds over land. The gust wind speeds over water use a gust factor taking into account the increase in the sea surface roughness with the increase in wind speed. For a storm of a given intensity, Table C6-2 takes into consideration both the reduction in wind speed as the storm moves from over water to over land due to changes in surface roughness and also the change in the gust factor as the storm moves from over water to over land [Ref. C6-22]. It should be noted that the sustained wind speed over water in Table C6-2 cannot be converted to a peak gust wind speed using the Durrant Curve from Fig. C6-4, which is only valid for wind blowing over open terrain (Exposure C).

Table C6-3 shows the design wind speed from the ASCE 7 basic wind speed map (Fig. 6-1) for various locations along the hurricane coastline from Maine to Texas. A tabulation is also provided for a wind speed equal to the square root of 1.5 times the basic wind speed from the map (column 4). This wind speed represents an approximate limit state event using the wind load factor of 1.6 from Section 2.3. It can be thought of as the equivalent wind speed used in determination of factored wind loads, in contrast to the basic wind speed that is used in determination of nominal wind loads. Tables C6-4 and C6-5 show the two different wind speeds in terms of the Saffir/Simpson Hurricane Scale. These tables indicate the hurricane category equivalents associated with the nominal and factored wind loads, respectively. Structures designed

**TABLE C6-3 DESIGN WIND SPEEDS AT SELECTED COASTAL LOCATIONS IN HURRICANE-PRONE AREAS**

Location	Basic Wind Speed from Fig. 6-1		$\sqrt{1.6} \times$ Basic Wind Speed	
	mph	(m/s)	mph	(m/s)
Bar Harbor, Maine	97	43.4	123	55.0
Hampton Beach, New Hampshire	102	45.6	129	57.7
Boston, Massachusetts	106	47.4	134	59.9
Hyannis, Massachusetts	117	52.3	148	66.2
Newport, Rhode Island	117	52.3	148	66.2
New Haven, Connecticut	112	50.1	142	63.5
Southampton, New York	120	53.6	152	67.9
Brooklyn, New York	116	51.9	147	65.7
Atlantic City, New Jersey	114	51.0	144	64.4
Bowers Beach, Delaware	98	43.8	124	55.4
Ocean City, Maryland	117	52.3	148	66.2
Virginia Beach, Virginia	114	51.0	144	64.4
Wrightsville Beach, North Carolina	132	59.0	167	74.6
Folly Beach, South Carolina	131	58.6	166	74.2
Sea Island, Georgia	120	53.6	152	67.9
Jacksonville Beach, Florida	120	53.6	152	67.9
Melbourne, Florida	129	57.7	163	72.9
Miami Beach, Florida	145	64.8	183	81.8
Key West, Florida	150	67.1	190	84.9
Clearwater, Florida	128	57.2	162	72.4
Panama City, Florida	129	57.7	163	72.9
Gulf Shores, Alabama	141	63.0	178	79.6
Biloxi, Mississippi	138	61.7	175	78.2
Slidell, Louisiana	125	55.9	158	70.6
Cameron, Louisiana	124	55.4	157	70.2
Galveston, Texas	131	58.6	166	74.2
Port Aransas, Texas	134	59.9	169	75.5
Hawaii	105	46.9	133	59.5
Puerto Rico	145	64.8	183	81.8
Virgin Islands	145	64.8	183	81.8

Note: All wind speeds in Table C6-3 are 3-s gust wind speeds at 33 ft (10 m) above open terrain.

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Massachusetts Department of Public Safety  
Public Hearing on State Building Code 7<sup>th</sup> Edition  
November 6, 2007

**Submitted Public Comments**

Chapters 53 (1 & 2 Family)

Proposed by Board of Building Codes and Standards

# AWC Guide to Wood Construction in High Wind Areas: 110 mph Wind Zone

## Massachusetts Checklist for Compliance (780 CMR 5301.2.1.1)<sup>1</sup>

☒ Check  
Compliance

### 1.1 SCOPE

Wind Speed (3-sec. gust) ..... 110 mph  
Wind Exposure Category ..... B

### 1.2 APPLICABILITY

Number of Stories (a roof which exceeds 8 in 12 slope shall be considered a story) \_\_\_\_\_ stories ≤ 2 stories  
Roof Pitch ..... (Fig 2) ..... ≤ 12:12  
Mean Roof Height ..... (Fig 2) ..... ft ≤ 33'  
Building Width, W ..... (Fig 3) ..... ft ≤ 80'  
Building Length, L ..... (Fig 3) ..... ft ≤ 80'  
Building Aspect Ratio (L/W) ..... (Fig 4) ..... ≤ 3:1  
Nominal Height of Tallest Opening<sup>2</sup> ..... (Fig 4) ..... ≤ 6'8"

### 1.3 FRAMING CONNECTIONS

General compliance with framing connections ..... (Table 2) .....

### 2.1 FOUNDATION

Foundation Walls meeting requirements of 780 CMR 5404.1

Concrete .....  
Concrete Masonry .....

### 2.2 ANCHORAGE TO FOUNDATION<sup>1,3</sup>

5/8" Anchor Bolts imbedded or 5/8" Proprietary Mechanical Anchors as an alternative in concrete only

Bolt Spacing – general ..... (Table 4) ..... in.  
Bolt Spacing from end/joint of plate ..... (Fig 5) ..... in. ≤ 6" – 12"  
Bolt Embedment – concrete ..... (Fig 5) ..... in. ≥ 7"  
Bolt Embedment – masonry ..... (Fig 5) ..... in. ≥ 15"  
Plate Washer ..... (Fig 5) ..... ≥ 3" x 3" x 1/4"

### 3.1 FLOORS

Floor framing member spans checked ..... (per 780 CMR Chapter 55) .....  
Maximum Floor Opening Dimension ..... (Fig 6) ..... ft ≤ 12'  
Full Height Wall Studs at Floor Openings less than 2' from Exterior Wall (Fig 6) .....  
Maximum Floor Joist Setbacks  
Supporting Loadbearing Walls or Shearwall ..... (Fig 7) ..... ft ≤ d  
Maximum Cantilevered Floor Joists  
Supporting Loadbearing Walls or Shearwall ..... (Fig 8) ..... ft ≤ d  
Floor Bracing at Endwalls ..... (Fig 9) .....  
Floor Sheathing Type ..... (per 780 CMR Chapter 55) .....  
Floor Sheathing Thickness ..... (per 780 CMR Chapter 55) ..... in.  
Floor Sheathing Fastening ..... (Table 2) .. d nails at \_\_\_\_\_ in edge / \_\_\_\_\_ in field

### 4.1 WALLS

Wall Height  
Loadbearing walls ..... (Fig 10 and Table 5) ..... ft ≤ 10'  
Non-Loadbearing walls ..... (Fig 10 and Table 5) ..... ft ≤ 20'  
Wall Stud Spacing ..... (Fig 10 and Table 5) ..... in. ≤ 24" o.c.  
Wall Story Offsets ..... (Figs 7 & 8) ..... ft ≤ d

### 4.2 EXTERIOR WALLS<sup>3</sup>

Wood Studs  
Loadbearing walls ..... (Table 5) ..... 2x \_\_\_\_\_ - \_\_\_\_\_ ft \_\_\_\_\_ in.  
Non-Loadbearing walls ..... (Table 5) ..... 2x \_\_\_\_\_ - \_\_\_\_\_ ft \_\_\_\_\_ in.  
Gable End Wall Bracing<sup>1</sup>  
Full Height Endwall Studs ..... (Fig 10) .....  
WSP Attic Floor Length ..... (Fig 11) ..... ft ≥ W/3  
Gypsum Ceiling Length (if WSP not used) ..... (Fig 11) ..... ft ≥ 0.9W  
and 2 x 4 Continuous Lateral Brace @ 6 ft. o.c. ... (Fig 11) .....  
or 1 x 3 ceiling furring strips @ 16" spacing min. with 2 x 4 blocking @ 4 ft. spacing in end joist or truss bays  
Double Top Plate  
Splice Length ..... (Fig 13 and Table 6) ..... ft  
Splice Connection (no. of 16d common nails) ..... (Table 6) .....

# AWC Guide to Wood Construction in High Wind Areas: 110 mph Wind Zone

## Massachusetts Checklist for Compliance (780 CMR 5301.2.1.1)<sup>1</sup>

### Loadbearing Wall Connections

Lateral (no. of 16d common nails).....(Tables 7).....

### Non-Loadbearing Wall Connections

Lateral (no. of 16d common nails).....(Table 8).....

### Load Bearing Wall Openings (record largest opening but check all openings for compliance to Table 9)

Header Spans .....(Table 9)..... ft in.  $\leq 11'$

Sill Plate Spans .....(Table 9)..... ft in.  $\leq 11'$

Full Height Studs (no. of studs).....(Table 9).....

### Non-Load Bearing Wall Openings (record largest opening but check all openings for compliance to Table 9)

Header Spans .....(Table 9)..... ft in.  $\leq 12'$

Sill Plate Spans .....(Table 9)..... ft in.  $\leq 12'$

Full Height Studs (no. of studs).....(Table 9).....

### Exterior Wall Sheathing to Resist Uplift and Shear Simultaneously<sup>4</sup>

#### Minimum Building Dimension, W

Nominal Height of Tallest Opening<sup>2</sup> .....  $\leq 6'8"$

Sheathing Type.....(note 4).....

Edge Nail Spacing .....(Table 10 or note 4 if less)..... in.

Field Nail Spacing .....(Table 10)..... in.

Shear Connection (no. of 16d common nails)(Table 10).....

Percent Full-Height Sheathing .....(Table 10)..... %

5% Additional Sheathing for Wall with Opening  $> 6'8"$  (Design Concepts).....

#### Maximum Building Dimension, L

Nominal Height of Tallest Opening<sup>2</sup> .....  $\leq 6'8"$

Sheathing Type.....(note 4).....

Edge Nail Spacing .....(Table 11 or note 4 if less)..... in.

Field Nail Spacing .....(Table 11)..... in.

Shear Connection (no. of 16d common nails)(Table 11).....

Percent Full-Height Sheathing .....(Table 11)..... %

5% Additional Sheathing for Wall with Opening  $> 6'8"$  (Design Concepts).....

### Wall Cladding

Rated for Wind Speed?.....

## 5.1 ROOFS

Roof framing member spans checked?.....(For Rafters use AWC Span Tool, see BBRs Website)

Roof Overhang .....(Figure 19)..... ft  $\leq$  smaller of 2' or L/3

### Truss or Rafter Connections at Loadbearing Walls

#### Proprietary Connectors

Uplift .....(Table 12)..... U= plf

Lateral .....(Table 12)..... L= plf

Shear .....(Table 12)..... S= plf

Tension .....(Table 12)..... T= plf

Ridge Strap Connections, if collar ties not used per page 21... (Table 13).....

Gable Rake Outlooker.....(Figure 20)..... ft  $\leq$  smaller of 2' or L/2

### Truss or Rafter Connections at Non-Loadbearing Walls

#### Proprietary Connectors

Uplift .....(Table 14)..... U= lb.

Lateral (no. of 16d common nails)....(Table 14)..... L = lb.

Roof Sheathing Type .....(per 780 CMR Chapters 58 and 59).....

Roof Sheathing Thickness ..... in.  $\geq 7/16"$  WSP

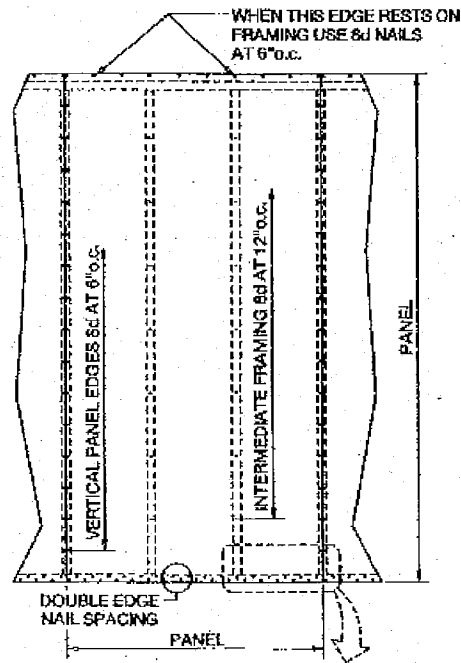
Roof Sheathing Fastening.....(Table 2).....

### Notes:

1. This checklist must shall be met in its entirety, excluding the specific exception noted in 2, to comply with the requirements of 780 CMR 5301.2.1.1 Item 1. If the checklist is met in its entirety then the following metal straps and hold downs are not required per the WFCM 110 mph Guide:
  - a. Steel Straps per Figure 5
  - b. 20 Gage Straps per Figure 11
  - c. Uplift Straps per Figure 14
  - d. All Straps per Figure 17
  - e. Corner Stud Hold Downs per Figure 18a and Figure 18b
2. Exception: Opening heights of up to 8 ft. shall be permitted when 5% is added to the percent full-height sheathing requirements shown in Tables 10 and 11.
3. The bottom sill plate in exterior walls shall be a minimum of two 2 in. (or single 4 in.) nominal thickness pressure treated #2-grade.

**AWC Guide to Wood Construction in High Wind Areas: 110 mph Wind Zone**  
**Massachusetts Checklist for Compliance (780 CMR 5301.2.1.1)<sup>1</sup>**

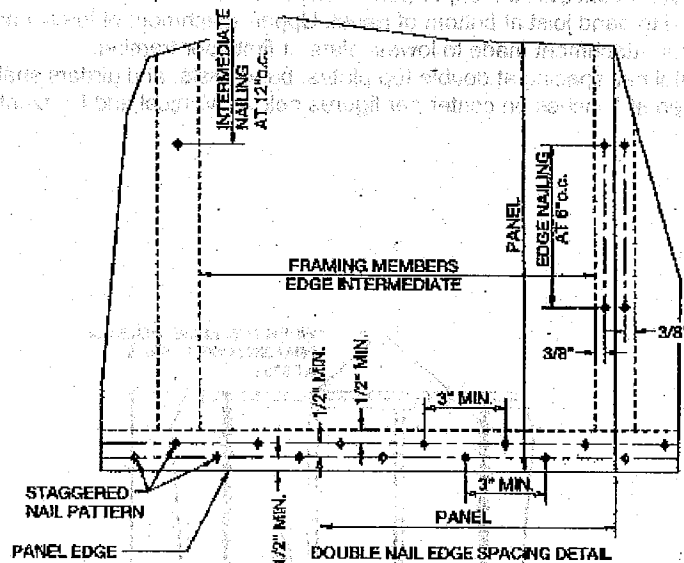
- 4.
- a. From Tables 10 and 11 and location of wall sheathing and Building Aspect Ratio, determine Percent Full-Height Sheathing and Nail Spacing requirements
  - b. Wood Structural Panels shall be minimum thickness of 7/16" and be installed as follows:
    - i. Panels shall be installed with strength axis parallel to studs.
    - ii. All horizontal joints shall occur over and be nailed to framing.
    - iii. On single story construction, panels shall be attached to bottom plates and top member of the double top plate.
    - iv. On two story construction, upper panels shall be attached to the top member of the upper double top plate and to band joist at bottom of panel. Upper attachment of lower panel shall be made to band joist and lower attachment made to lowest plate at first floor framing.
    - v. Horizontal nail spacing at double top plates, band joists, and girders shall be a double row of 8d staggered at 3 inches on center per figures below : Vertical and Horizontal Nailing for Panel Attachment



See Detail on Next Page

Vertical and Horizontal Nailing  
for Panel Attachment

# **AWC Guide to Wood Construction in High Wind Areas: 110 mph Wind Zone** **Massachusetts Checklist for Compliance (780 CMR 5301.2.1.1)<sup>1</sup>**



Detail  
 Vertical and Horizontal Nailing  
 for Panel Attachment

Massachusetts Department of Public Safety  
Public Hearing on State Building Code 7<sup>th</sup> Edition  
November 6, 2007

**Submitted Public Comments**

Chapters 61

Proposed by Peter Gould

## Guigli, Mike (DPS)

**From:** Peter Gould [peter@gouldhvac.com]  
**Sent:** Wednesday, November 07, 2007 9:51 AM  
**To:** 'Guigli, Mike (DPS)'  
**Subject:** RE: Massachusetts Code Amendment - Duct Insulation Chapter 61

Mike,

To follow up on yesterday's code meeting, I wanted to remind you about the confusion in the table below. The 2003 International Energy Conservation Code and, I believe, the 2003 International Residential Code, both show the R-6 and R-8 values in Table 6106.4.4.3 in the reversed positions from what is published in the Massachusetts 7<sup>th</sup> edition version.

**"Ducts in ventilated attics, ventilated crawlspaces, and outside the building"... should be listed as R-8 for supply ducts.** I assume that the return ducts in that situation falls under the "unconditioned spaces", (which is the same as "ventilated spaces"??) shown in the other half of the table which should be R-4 but isn't very specific in the table.

**Supply ducts in "unconditioned spaces",** (different from ventilated spaces? It is the same temperature in my ventilated attic as it is in my unconditioned crawlspace!) **should be listed as requiring R-6 in the table.**

To be brief, switch the 8 and the 6 on the table to agree with the 2003 ICC rules.

Mike, I am convinced that this table has complicated duct insulation so much, (R-2, R-4, R-6 & R-8), that it will make the contractor and inspector either throw up their hands or throw down their gloves? The energy saved with these differing R-values is miniscule – about 1%. The true savings is found in duct sealing: 20 – 35%. That is where Massachusetts consumers will reap the greatest benefit. A minority of inspectors will try to enforce the table but most will look at the insulated duct and move on no matter what R-values are used. It's painfully obvious to me that one R-value - R-6 - will serve the consumer, contractor and inspector best.

Sorry to ramble on. Thanks for your help with the wording of the code proposal. It was good to meet you.

Peter

**TABLE 6106.4.4.3  
MINIMUM DUCT  
INSULATION**

<b>INSULATION R-VALUE (<math>h \bullet ft^2 \bullet ^\circ F</math>)Btu</b>			
Ducts in ventilated attics, ventilated crawl spaces, and outside the building.		Ducts in unconditioned basements, unventilated crawl spaces, garages, and other unconditioned spaces.	
Supply	Return	Supply	Return
6	4	8	2



---

**From:** Peter Gould [mailto:peter@gouldhvac.com]  
**Sent:** Tuesday, October 02, 2007 12:14 PM  
**To:** 'Guigli, Mike (DPS)'  
**Cc:** 'Steve Ray'; 'Monty Millspaugh'; dale.tokarski@reflectixinc.com  
**Subject:** Massachusetts Code Amendment - Duct Insulation Chapter 61

The Department of Public Safety/BBRS  
Attention: Mike Guigli

Massachusetts Building Code for One- and Two- Family Dwellings – 7<sup>th</sup> Edition  
Based on the 2003 International Residential Code®

**Date:** October 2, 2007

**Re:** Amendment to Chapter 61, Section 6106 – General Requirements

**Proponent:** Peter Gould - The Gould Company, Needham ,MA.  
Representing: Reflectix, Inc., Markleville, Indiana - insulation manufacturer.

***This proposal is offered to provide a reasonable simplification of duct insulation R-values for the Massachusetts 7<sup>th</sup> Edition Building Code for 1- and 2- Family Dwellings.***

**Code Change Proposal:**

*Revise as follows:*

**6106.4.4.3 Duct and plenum insulation.** All supply and return-air ducts and plenums installed as part of an HVAC air-distribution system shall be thermally insulated in accordance with Table 6106.4.4.3.

**Exceptions:**

1. Factory-installed plenums, casings or ductwork furnished as a part of the HVAC equipment tested and rated in accordance with Section 6106.4.2.
2. Ducts within the conditioned space that they serve.
3. R-6 duct insulation shall be allowed when the equipment being installed meets or exceeds the Energy Star® requirements. Where two appliances are used within the same distribution system, at least one appliance must meet EPA requirements. R-6 insulation must be used throughout the entire duct distribution system.

**Existing Table:** (ICC Code Book – Massachusetts Edition, printed 2007)

**TABLE 6106.4.4.3  
MINIMUM DUCT INSULATION**

<b>INSULATION R-VALUE (<math>h \bullet ft^2 \bullet ^\circ F</math>)Btu</b>			
<b>Ducts in ventilated attics, ventilated crawl spaces, and outside the building.</b>		<b>Ducts in unconditioned basements, unventilated crawl spaces, garages, and other unconditioned spaces.</b>	
<b>Supply</b>	<b>Return</b>	<b>Supply</b>	<b>Return</b>
<b>6</b>	<b>8</b>	<b>4</b>	<b>2</b>

**Supporting Information:**

Increasing the appliance efficiency and using a single R-value, specifically R-6 insulation, throughout the duct system will simplify the installation process and bring Massachusetts code closer to parity with the U. S. Department of Energy installation recommendations.

a.) This exception complies with the installation guidelines of the U. S. Department of Energy/EPA Energy Star Program which requires:

- R-6 duct insulation.
- SEER-14 central air conditioning equipment.
- Furnace efficiencies of 83%, (oil), or 90%, (gas).

b.) The State of Texas adopted this insulation option, known as the "Texas Trade-off", several years ago.

c.) This will allow the installing contractor a choice in insulation materials, i.e. fiberglass or bubble-wrap, and prevent the exclusion of accepted products currently in the market.

d.) There is not a clear economic case for R-8 duct insulation as illustrated by the EPA's Energy Star Program, which requires R-6 insulation.

e.) A single insulation R-value will allow for a simpler inspection process.

**Cost impact:** An additional up-front cost for higher efficiency equipment, approximately \$500, could be offset by the Energy Star Rebate available from the utility company, \$300. In addition, the homeowner would have lower utility bills for the life of the equipment, 15-20 years.

Peter Gould



16 Eaton Square Needham, MA 02492  
781.444.0562 office 617.429.6045 cell



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Checked by AVG Free Edition.

Version: 7.5.488 / Virus Database: 269.13.39/1044 - Release Date: 10/2/2007 11:10 AM

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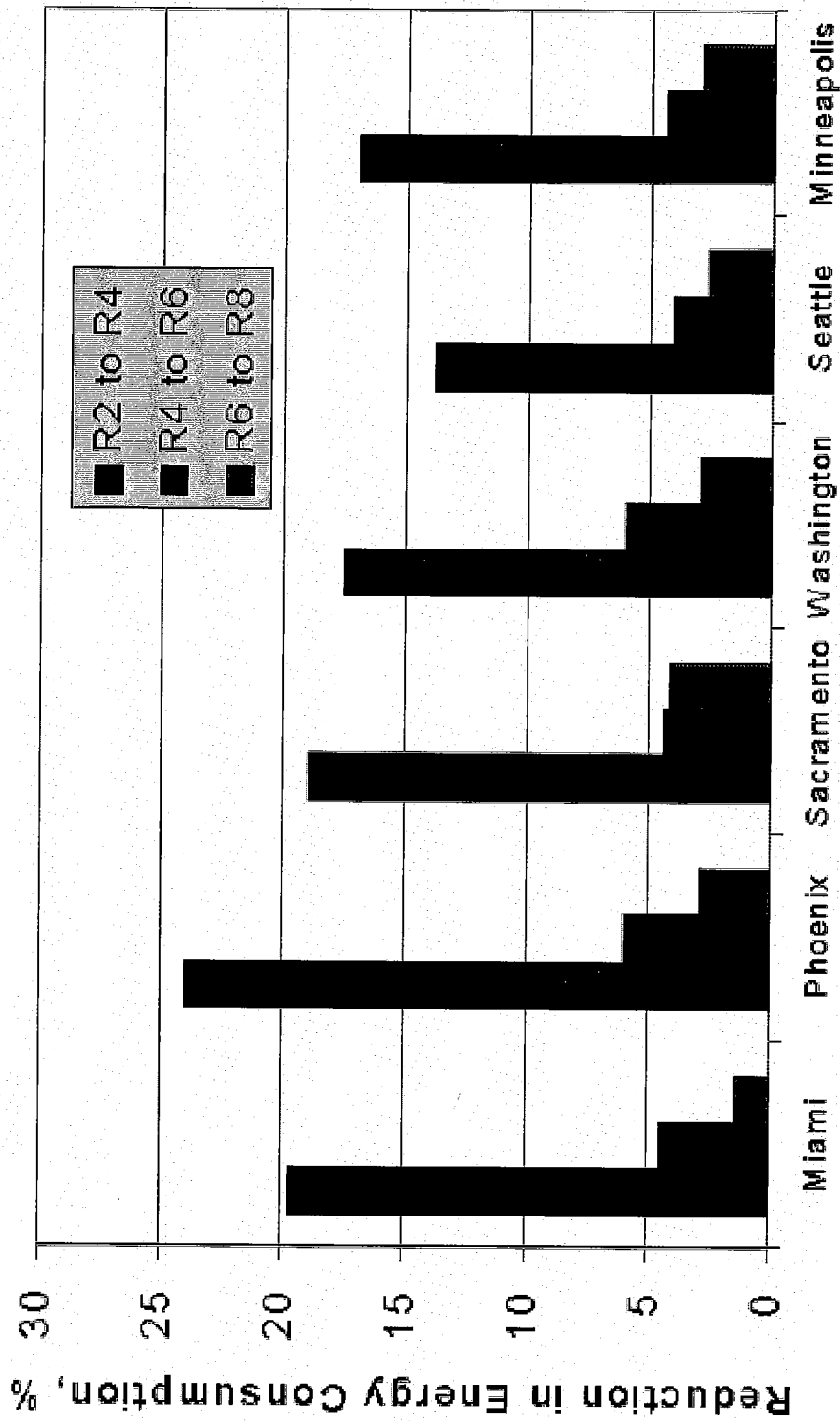
Version: 7.5.488 / Virus Database: 269.13.39/1044 - Release Date: 10/2/2007 11:10 AM

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Version: 7.5.503 / Virus Database: 269.15.24/1115 - Release Date: 11/7/2007 9:21 AM

# Effects of adding insulation to attic ducts for a typical house and duct system in the summer



Massachusetts Department of Public Safety  
Public Hearing on State Building Code 7<sup>th</sup> Edition  
November 6, 2007

**Submitted Public Comments**

General

Proposed by Department of Environmental Protection



COMMONWEALTH OF MASSACHUSETTS  
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

DEVAL L. PATRICK  
Governor

TIMOTHY P. MURRAY  
Lieutenant Governor

IAN A. BOWLES  
Secretary

LAURIE BURT  
Commissioner

November 6, 2007

Chairman Gary Mosher  
Board of Building Regulation and Standards  
Department of Public Safety  
One Ashburton Place  
Boston, MA 02108

Dear Chairman Mosher:

The Department of Environmental Protection (the "Department" or "MassDEP") is writing to express its support for the Proposed 7<sup>th</sup> edition of the Basic Building Code. MassDEP is particularly pleased with the inclusion of the new Appendix G that sets out the standards for Flood Resistant Construction and Construction in Coastal Dunes.

Appendix G incorporates the regulatory revisions proposed by the Technical Advisory Committee on Coastal Construction and Environmental Issues ("TACCEI"), a technical committee established by the Board of Building Regulations and Standards (BBRS). As established by the BBRS, the mission of the TACCEI was to provide advice relative to coastal high hazard construction requirements, address any overlapping regulatory conflicts between the State building Code and MassDEP regulations governing building in coastal high hazard areas, and propose any necessary regulatory revisions to the Building Code and/or MassDEP regulations. Representatives of MassDEP and the Department of Public Safety participated in the TACCEI.

The TACCEI began its work by proposing revisions to the Building Code to bring the 7<sup>th</sup> edition into compliance with the National Flood Insurance Program ("NFIP"). The TACCEI proposed these revisions to ensure the continued availability of flood insurance to the owners of properties located in coastal high hazard areas.

After Hurricane Katrina, FEMA and the International Code Commission ("ICC") recommended that buildings constructed in any area prone to flooding and storm damage be elevated above the base flood elevation as currently required by the NFIP and the 6<sup>th</sup> edition. To protect the public safety and prevent personal injury and property damage, the TACCEI adopted this recommendation with regard to construction in the velocity zone only, the area most vulnerable to storm damage. Thus, Appendix G requires that the bottom of the lowest horizontal structural member of a building constructed in the velocity zone be elevated at least 2 feet above the base flood elevation. MassDEP strongly supports this provision, since it furthers the state's

interest in storm damage prevention, an interest MassDEP is charged with promoting under the Wetlands Protection Act, M.G.L. c. 131 § 40.

MassDEP applies the Wetlands Protection Act and the regulations promulgated thereunder at 310 CMR 10.00 whenever work is proposed in a coastal wetland resource area. A coastal velocity zone is located within the coastal wetland resource area known as land subject to coastal storm flowage. By strengthening the elevation requirements for construction in the portion of land subject to coastal storm flowage that is located within the Velocity Zone, Appendix G of the Building Code is entirely consistent with the requirements of the Wetlands Protection Act and the Wetlands Protection Act Regulations.

To further the interest of storm damage prevention, the Wetlands Protection Act Regulations regulate work on coastal dunes. Coastal dunes provide natural protection against storm damage and flooding. To preserve these functions, the Wetlands Protection Act Regulations prohibit any work on a coastal dune that interferes with the lateral movement of the dune including the construction of buildings that are not elevated on open pilings.

The 6<sup>th</sup> edition of the Building Code contains no special requirements for construction in coastal dunes. As a result, an applicant proposing to build a structure with a solid foundation on a secondary coastal dune could receive a building permit from the Building Official authorizing construction and an Order of Conditions from the Conservation Commission denying permission to construct the proposed structure. To eliminate this potential conflict, Appendix G provides that buildings located on coastal dunes must be elevated as required by the Final Order of Conditions issued pursuant to the Wetlands Protection Act.

With input from the BBRS and the Department of Public Safety, MassDEP has prepared a map for Building Officials that will enable them to easily determine when a structure is proposed in a coastal wetland resource area. MassDEP will work with the Department of Public Safety to train Building Officials and local Conservation Commissions so that they can work together to implement the requirements for coastal dunes without creating undue burdens for applicants.

In closing, MassDEP wishes to thank the BBRS for establishing the TACCEI and for including the TACCEI recommendations in Appendix G of the 7<sup>th</sup> Edition. MassDEP looks forward to working with the Department of Public Safety on the joint training effort.

Sincerely,



Glenn Haas  
Acting Assistant Commissioner  
Bureau of Resource Protection

Cc: Tom Riley

Massachusetts Department of Public Safety  
Public Hearing on State Building Code 7<sup>th</sup> Edition  
November 6, 2007

**Submitted Public Comments**

General

Proposed by A. Vernon Woodworth, AIA

**BBRS Public Hearing Testimony**  
**November 6, 2007**

**A. Vernon Woodworth AIA**

Speaking in my role as Chair of the Boston Society of Architects' Codes Committee I welcome the draft 7<sup>th</sup> edition of the Massachusetts State Building Code, based for the first time upon the International Building Code. There are many aspects of the new code that will benefit the design and construction communities without sacrifice to life-safety. By adopting a code based on the 2003 IBC Massachusetts is asserting its competitiveness with other adjacent states and making good on a commitment to the most recent and universally accepted construction requirements.

The BSA applauds the adoption of up-to-date model building codes with a minimum of local amendments for a number of reasons. Codes at the national level are produced on a regular cycle by a well-oiled machinery of stakeholders. Input is available from all perspectives and geographical regions, and the results are then adopted by all jurisdictions, unless a compelling reason requires an amendment. The highest level of coordination, accompanied by technical support and training, is guaranteed by sticking with the model code requirements.

The process of code adoption is also made much simpler if local amendments are minimized. Relying on volunteer committees, operating without a clear mandate, on no specific timeframe, is an invitation for delay, confusion and poor coordination. Of even greater concern, a committee with an agenda driven by only one sector of the design and building community can result in code requirements that are not in the overall best interests of the Commonwealth.

If I could mention just two examples. The regulation of existing buildings is key to the economic health of our cities and towns, where the encouragement of on-going incremental investment promotes community, maximizes existing infrastructure investment, and reduces sprawl. Massachusetts leads the nation in regulating this critical building category. Any changes to the approach to existing buildings employed by our Chapter 34 should be undertaken only in response to a clearly defined need, and should be vetted by all stakeholders in this arena. The draft 7<sup>th</sup> edition of Chapter 34 before us today contains an entirely new approach to structural requirements for existing buildings, one that requires the services of a structural engineer just to determine which category of requirements your project falls under. Both Chapter 34 and Chapter One have added requirements for structural peer reviews of existing buildings under certain conditions, where none existed previously. In response to these modifications, we would like the Board to ask, "Where is the need? Where are the existing buildings whose proven ability to withstand gravity and lateral loads can no longer be trusted? What renovations of existing buildings have recently demonstrated the need for the peer review process?" Another critical question that deserves to be asked is, "What will the economic and time impacts of these new requirements be?" At this point only the BBRS can ask these questions before these requirements become mandatory, with unknown consequences.

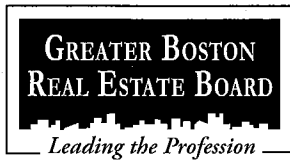
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Massachusetts Department of Public Safety  
Public Hearing on State Building Code 7<sup>th</sup> Edition  
November 6, 2007

**Submitted Public Comments**

General

Proposed by Greater Boston Real Estate Board  
in conjunction with the Sullivan Code Group



November 6, 2007

Richard J. Loughlin, Jr.  
*Chairman*

William M. McLaughlin  
*Chairman-Elect*

Thomas O'Brien  
*Treasurer*

Susan M. Wolkoff  
*Assistant Treasurer*

James A. Canfield  
*Clerk*

Gregory P. Vasil  
*Chief Executive Officer*

Mr. Robert Anderson, Administrator  
Board of Building Regulations & Standards  
1 Ashburton Pl. Room 1301  
Boston, MA 02108

**RE: GBREB Comments on 7<sup>th</sup> Edition State Building Code**

Dear Mr. Anderson:

The Greater Boston Real Estate Board (GBREB) is a trade association of over 7,500 real estate professionals who share a 118 year tradition of excellence in all sectors of the industry. The Board comprises five distinct divisions, each representing a particular real estate constituency but all joined under the GBREB umbrella. Our members include both residential and commercial developers, owners, property managers, banking, legal and brokerage professionals. Our organization has the unique perspective of being able to assess the impact of laws and regulations affecting development throughout every phase of a development project including financing, permitting, construction, marketing, leasing and management.

As the parent organization which represents the Building Owners & Managers Association (BOMA) we are primarily concerned with sections of the code impacting commercial structures. BOMA Boston is comprised of over 450 commercial developers, owners and property managers who represent, in the aggregate, over 100,000,000 square feet of commercial, retail and industrial space in Boston and its suburbs. We thank the Board of Building Regulations & Standards for the opportunity to submit testimony regarding changes to the 7<sup>th</sup> Edition Building Code.

Enclosed please find a copy of the detailed analysis which has been prepared on our behalf by the Sullivan Code Group. We appreciate your consideration of our concerns.

Regards,

Patricia Baumer  
Director of Government Affairs  
Greater Boston Real Estate Board

**Sullivan Code Group****R.W. Sullivan, Inc.**

November 5, 2007

Greater Boston Real Estate Board  
11 Beacon Street 1<sup>st</sup> Floor  
Boston MA 02108

Attn: Patricia Baumer, Director of Government Affairs

**Re: MSBC – 7<sup>th</sup> Edition Changes**

Dear Patricia,

Following is our inventory of significant changes between the 6<sup>th</sup> and the 7<sup>th</sup> editions of the Massachusetts State Building Code. Our comments are in *italics*. Where new language is inserted in an existing requirement it is underlined. Where a portion of a requirement has been deleted this is indicated with a ~~strike through~~. Where an entire new requirement or paragraph is inserted it is either described in italics or reproduced in normal font. We also are proposing amendments to the draft 7<sup>th</sup> edition which we fill forward for your information under separate cover.

**CHAPTER 1:**

*The “Administration” chapter is completely unique to Massachusetts and establishes the legal framework within which 780 CMR is applied. It also covers the make-up of the Board of Building Regulations and Standards (BBRS), which oversees the Building Code, the make-up of its various advisory subcommittees, and the process for hearing appeals.*

*The draft Chapter One for the 7<sup>th</sup> edition has undergone some stylistic and technical revisions, generally improving clarity with regard to applicable Massachusetts General Laws and related specialized codes.*

**101.2 Scope** *The 6<sup>th</sup> edition defines the scope of 780 CMR in accordance with “St. 1984, c.348, as amended”. The draft 7<sup>th</sup> edition defines the scope of 780 CMR “in accordance with MGL c143 sections 92-100, as amended”.*

**102.2 Matters not provided for:** *The existing language of the 6<sup>th</sup> edition has been carried over to the draft 7<sup>th</sup> edition, and the following added:*

**Note 1** – Buildings and portions of buildings and specialty building permittable systems dedicated to: specialized industrial processes, water treatment, waste water treatment, other specialized chemical and factory

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processes, etc.; certain aspects of public transportation buildings and other highly specialized buildings or portions thereof may require that aspects of their design and construction conform to certain Specialized Code requirements and/or nationally-recognized design and construction standards not explicitly identified in this code and the architects/engineers of record are responsible for providing to the Building Official, sufficient information, calculations and technical defense as to why such buildings or portions thereof and building permissible systems should be addressed under this section of the code and not otherwise be required to comply with the code generally and as applicable.

*An application of this section would be to the design of egress for a rail platform according to the NFPA 130 standard for Fixed Guideway Transit and Passenger Rail Systems, a standard that is not referenced by 780 CMR.*

**102.5.4-102.5.6** *These sections are new to Chapter 1 however simply duplicate information previously (6<sup>th</sup> edition) and currently (draft 7<sup>th</sup> edition) found in Chapter 34.*

**106.5.1-106.5.1.1.2** *These sections describe a new requirement for annual inspection of all premises licensed by the ABCC where alcoholic beverages are consumed on the premises.*

**109.3 Minor Modifications:** *This section is new and allows the building official to vary the terms of the code under certain conditions if certain procedures are followed.*

**109.3.1 Areas prone to flooding:** *This section states the Building Official does not have the authority to vary the terms of any provision related to areas prone to flooding.*

**109.4 Alternative materials and equipment:** *This section continues to allow the use of alternative materials, appliances, equipment, or methods of design or construction when the building official is satisfied that the proposed alternative is at least the equivalent of that prescribed in 780 CMR in quality, strength, effectiveness, fire resistance, durability and safety. Energy efficiency has been added to this list of required equivalencies in the draft 7<sup>th</sup> edition.*

**110.4 Form of application:** *The draft 7<sup>th</sup> edition requires specific information on all permit applications including 1) description of work, 2) legal description of land on which proposed work will be performed, such as street address or similar description, 3) use and occupancy for which proposed work is intended, 4) valuation of proposed work, and 5) signature of applicant or authorized agent.*

**110.7 Construction documents:** *As previously the draft 7<sup>th</sup> edition requires the submittal of three sets of construction documents with the permit application, however the new code is proposed to state that "when*

780 CMR section 116 is applicable, only one set of construction documents need bear the original signature and original (wet) seal". An additional paragraph is added to this section stating:

"Construction documents shall be drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that the work will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official."

**110.7.2 Engineering preparation of construction documents:** *This is a new section which states:* In accordance with MGL c 112 para. 81D et seq, the design of any structural member which is not prescriptively identified in this code requires the services of a registered professional engineer. A building official shall require engineering plans, specifications, calculations, and/or details of sufficient clarity to indicate that such engineering work will conform to the provisions of this code and relevant laws, ordinances, rules and regulations.

**110.11 Independent Structural Engineering Review:** *This section contains several new triggers for the requirement of independent structural engineering review, as follows:*

2. New buildings and structurally separate additions which enclose a total volume of 400,000 cubic feet, including stories below grade. The volume shall be measured using the outside dimensions of the building.

3. New or existing structures in or partially in Use Group A used for public assembly of 300 or more persons.

4. Existing buildings which enclose a total volume of 200,000 cubic feet, including stories below grade, for what Chapter 34 defines as Level 3, 4, and 5 Work.

5. Existing buildings which enclose a total volume of 200,000 cubic feet, including stories below grade, for what Chapter 34 defines as Level 2 Work, except that the required review shall be limited to the lateral load resisting system.

*These requirements have been introduced by the structural engineering community without any clear indication of their cost/benefit. Independent structural engineering review, commonly referred to as "structural peer review", requires the owner to hire a second structural engineer to verify the design of the structural engineer of record. The process adds time as well as cost to the project.*

**111.4 Water Supply:** *This section requires a water supply as a precondition of a permit to build. The draft 7<sup>th</sup> edition adds reference to "DEP Regulations 310 CMR 22.00 and/or 310 CMR 36 when applicable".*

**111.7 Hazards to air navigation:** *This is a new section in the draft 7<sup>th</sup> edition that adds a requirement for permitting by the Massachusetts Aeronautics Commission for new buildings or additions within airport approaches as defined in M.G.L. c.90, para. 35B.*

**116.0 Registered Architectural and Professional Engineering Services- Construction Control:** *The following change to the list of projects exempted from construction control is proposed for the 7<sup>th</sup> edition:*

1. Any building containing less than 35,000 cubic feet of enclosed space, measured to the exterior surfaces of walls and roofs and to the top of a ground supported floor, or in the case of a crawl space, to the bottom surface of the crawl space. In the case of basement floors or levels, the calculation of enclosed space shall include such spaces. For additions to existing buildings, the volume of enclosed space shall include the entire existing building and all proposed additions.

*This proposed additional requirement will extend the requirement for professional design services to any addition where the total volume of the proposed addition and the existing building exceed 35,000 cubic feet. The origins and rationale for this proposal are unknown.*

**116.2 Architect/engineer responsibilities during construction:** *This section continues to require review of shop drawings, quality-control procedures, and periodic presence on the job site. The following requirements have been added to the draft 7<sup>th</sup> edition:*

The application of the permit shall not be deemed to be complete until all of the Construction Control Documents (as defined in Appendix M) have been submitted (also see 780 section 110.0).

Final documentation of the compliance of the work per the plans and specifications shall be provided, and, when required by the Building Official, at the completion of each phase of construction.

**780 CMR 120.2 (Certificate of Occupancy) Buildings or structures hereafter altered:** *The following changes have been made at the end of this section:*

~~Any use or occupancy which was not discontinued during the work of alteration, shall be discontinued within 30 days after completion of the alteration unless the required certificate is issued.~~

Conformance to all applicable Specialized Codes is a requirement of the issuance of the Certificate of Use and Occupancy, including, when applicable, 310 CMR 7.00, 310 CMR 15.00, 310 CMR 22.00 or CMR 30.00.

**780 CMR 120.3 Temporary occupancy:** *The following changes have been made at the end of this section:*

~~Any occupancy permitted to continue during the work shall be discontinued within 30 days after completion of the work unless a certificate of occupancy is issued by the building official.~~

The Building Official may consult with all sub-trade inspectors for issues pertaining to life safety and shall consult with the Fire Official pertaining to issues of adequacy of fire protection systems prior to the issuance of a Temporary Certificate.

**120.5 Posting structures:** *This section has been modified with the following requirements:*

**120.5.1 Posting of use and occupancy:** A copy of the Certificate of Occupancy and Use shall be posted at the main entry or be made readily available for inspection.

**120.5.2 Required Egress Posting:** A suitably designed placard, approved by the building official shall be posted by the owner on all floors of every building and structure, except High Hazard, Factory, and I-3 use occupancies, as defined in 780 CMR 3. In addition to the per floor requirement, all rooms used as a place of assembly or as an R-1 sleeping space shall have the required egress posting. Said placard shall designate all of the occupant loads approved for each configuration within each room or space.

**120.5.3 Place of Assembly Posting:** A placard suitably designed in contrasting colors and approved by the building official, shall be posted by the owner in every room where practicable of every building and structure and part thereof designed for use as a place of public assembly (use groups A). Said placard shall designate all of the occupant loads approved for each configuration within each room or space.

**121.7-.8 Standards for making abandoned buildings safe and secure:** *These are new requirements within the "Unsafe Structures" section that require the removal of all materials determined by the head of the fire department or building official to be dangerous in case of fire, securing of the building, and maintain existing fire protection systems and utilities unless permission to disconnect is granted by the fire and building official respectively.*

**122.4.4 Contents of decision: (State Building Code Appeals Board)**

*The following change was made to this section:*

A decision shall not be considered by any person or agency as a precedent for future decisions except as provided in Section 780 CMR 903.2.1. *Although this reference does not appear to be coordinated properly this is an apparent reference to a recent decision by the BBRS to allow the approval of an alternative means of design for fire protection by the Building Code Appeals Board to serve for future installations of the*

same system in the same building types. This policy was developed following a request by Lowe's Home Improvement stores.

#### **124.0 Fire Prevention-Fire Protection Advisory Committee**

A required 17<sup>th</sup> appointment to this critical subcommittee has been added: a member proposed jointly by the Massachusetts Burglar and Fire Alarm Association and the Automatic Fire Alarm Association, New England.

### **Section 401 Scope**

#### **401.1 – 401.3**

Draft language at the beginning of the 7<sup>th</sup> edition attempts to state the relationship of the requirements of this section to the International Fire Code (IFC) and International Mechanical Code (IMC), which it references, limiting the applicability of these codes in order to stay within the jurisdiction of the BBRS and to minimize the possibility of conflicts with the Massachusetts Fire Prevention Regulations (527 CMR). The language here is vague and likely to lead to misunderstanding. Fortunately the International Mechanical Code (IMC 2003) is a referenced standard of the 7<sup>th</sup> edition and there are not likely to be significant conflicts with 527 CMR. However the nature of the relationship to the International Fire Code (IFC) could result in conflict jurisdictions and enforcement between the Building and Fire Departments.

### **Section 402 Covered Mall Buildings**

#### **402.9 Smoke Control**

The proposed 7<sup>th</sup> edition language does not required a smoke control system in all covered mall buildings. Smoke control is only required in malls containing an atrium (see 404.4, below).

#### **402.10 Kiosks**

The 7<sup>th</sup> edition will state that a permit is required from the head of the fire department for all kiosks.

#### **402.13 Emergency Voice/Alarm Communication System**

Covered malls exceeding 50,000 square feet require a voice alarm system for the first time under the provisions of the draft 7<sup>th</sup> edition.

### **Section 403 High-rise Buildings**

#### **403.2 Automatic sprinklers**

The draft 7<sup>th</sup> edition contains language that could require a secondary water supply for the sprinkler system per 903.3.5.2 depending on the Seismic Design Category of the building.

#### **403.9 Elevator Lobbies**

Except for the main entrance level all elevators shall open into a 1-hour fire rated elevator lobby. The exception allowing the omission of elevator lobbies when the elevator shafts are pressurized has been deleted. This

section should also be made consistent with the stair concept that it only applies to elevators more than 70' in height.

## **Section 404 Atriums**

### **404.4 Smoke Control**

Smoke control is now required in all atriums. This eliminates the 2-story atrium loop-hole commonly used in residential buildings to avoid separating a two-story opening from the corridors. However there are other options as referenced in exceptions to this section, such as Section 707.2, exceptions 2, 7, 8 or 9, and Section 1019.1, exception 8 or 9.

### **404.7 Interior Finish**

The interior finish of walls and ceilings within an atrium is limited to Class B materials with no reduction for sprinkler protection.

## **Section 406.0 Motor-vehicle Related Occupancies**

### **406.2.2 Clear Height**

New Parking Garages must be provided with a clear height of 7ft. Any parking garages accommodating accessible van parking must be provided with a clear height of 8ft 2in.

### **406.2.6 Floor Surface**

Parking surfaces must be concrete or similar non-combustible and non absorbent materials. Asphalt is allowed on the ground floor level.

### **406.2.8 Special Hazards**

Rooms containing fuel burning appliances must be separated by a vestibule and a two-doorway configuration unless the ignition source in the appliance is 18 inches or more above the floor level.

### **406.3.5 Area and Height**

The height and area of open parking garages containing other uses (i.e. first floor commercial tenants) must comply with the height and area limitations of chapter 5, and the open parking garage limitations are no longer applicable.

## **Section 412.0 Aircraft related occupancies**

### **412.2-412.5 Aircraft Hangars, etc.**

The draft 7<sup>th</sup> edition contains a series of completely new sections specifically addressing aircraft hangars, aircraft hangers attached to homes, aircraft paint hangers, heliports & helistops.

### **413.2 Attic, under-floor and concealed spaces**

Attics, under-floor, and/or concealed spaces housing combustible storage must be either sprinklered or protected with 1-hour rated construction on the storage side. Most of these spaces would already require sprinkler protection if they are accessible and can be used for storage.

## **CHAPTER 5:**

### **Table 503 Allowable Height and Building Areas**

*The IBC took the highest allowances for height and area from each of the previous three model codes and combined them into a new table which allows larger structures in most construction types and use groups. Because construction type designations have changed (see Chapter 6 below) as have the methods for computing increases for sprinklers and perimeter access, the height and area sections constitute one of the more visible new aspects of the draft 7<sup>th</sup> edition.*

#### **506 Area Modifications**

*The area modifications employ a completely new methodology in the 7<sup>th</sup> Edition and typically allow for larger buildings. The increases give a larger increase for providing sprinkler protection within the building than the 6<sup>th</sup> Edition.*

#### **507.2 Unlimited Area Building**

*The open perimeter for an unlimited area building is required to be 60' rather than 30' in the previous 6<sup>th</sup> Edition. Massachusetts has chosen not to include the provisions for nonsprinklered one story unlimited area buildings and for two story sprinklered unlimited area buildings in the draft 7<sup>th</sup> edition.*

**507.5 Group A-3 buildings:** *This new section allows a building in Use Group A-3 built in construction type I or II to be unlimited in area under four specific conditions.*

**507.6 High-hazard use groups:** *This new section allows buildings in Use Groups H-2, H-3, and H-4 to be unlimited in area under certain specific conditions.*

**507.8 Group E buildings:** *This new section allows a one story Use Group E building of Type II, IIIA or IV construction to be unlimited in area when three specific conditions are met.*

**507.9 Motion picture theaters:** *This new section allows a one-story motion picture theater if Type I or II construction to be unlimited in area under certain specific conditions.*

#### **508 Special Provisions**

*This is a new section allowing buildings with specific features to be of multiple construction types. The most significant allowance is as follows:*

#### **508.2 Group S-2 Enclosed Parking with Group A, B, M, or R above**

*This new section allows a parking structure to be considered a separate building than the building(s) above with respect to height and area limits. This section requires the parking structure to be of Type IA construction*

and be separated from the building above by a 3 hour rated floor slab. Any firewalls above are permitted to terminate at the rated floor slab rather than the foundation. This section is typically used to allow multiple low rise wood frame buildings to be built above a large parking structure.

**508.3 Group S-2 enclosed parking garage with Group S-2 open parking garage above:** This new section, similar to 508.2 above, allows the construction of an open parking garage above an underground enclosed parking garage under five specific conditions.

**508.4 Parking beneath Group R:** This new section allows the height and area of Use Group R, when built above a maximum one story above grade Group S-2 parking garage, to be computed separately from the garage.

**508.5 Group R-2 buildings of Type IIIA construction:** This new section allows an increased height for this use group and construction type under certain specific circumstances.

**508.6 Group R-2 buildings of Type IIA construction:** This new section allows an increased height for this use group and construction type under certain specific circumstances.

**508.7 Open parking garage beneath Groups A, I, B, M and R:** This new section allows the height and area limitations for the uses above an open parking garage to be calculated separately.

## CHAPTER 6:

### 603.1 Allowable Combustible Materials in Type I and II Construction

The list of permitted materials and locations has been expanded.

#### Table 601 Fire Resistance Rating Requirements for Building Elements

The table has been reduced to list only the structural elements. A major change is the elimination of Type 1A (4 hour) construction. The remaining noncombustible construction types have been promoted. IBC construction types are designated with Roman Numerals rather than italic numbers. The construction types have the same general rating requirements but the classification has changed as follows:

6 <sup>th</sup> Edition Classification	Corresponding 7 <sup>th</sup> Edition Classification
Type 1A	Eliminated
Type 1B	Type IA
Type 2A	Type IB
Type 2B	Type IIA
Type 2C	Type IIB
Type 3A, 3B, 4, 5A, & 5B	No change

**Table 602**

The required exterior wall ratings have been relocated in the code to Chapter 6. The requirements are also much more restrictive for higher construction types in the 7<sup>th</sup> Edition. Buildings with rated construction must have a fire separation distance in excess of 30' to have exterior walls with no fire resistance rating. The 6<sup>th</sup> Edition typically allowed unrated exterior walls for buildings with a fire separation distance more than 10' regardless of construction type.

**CHAPTER 7:**

**703.3 Alternative methods for determining fire resistance:**

This is a new section that explicitly allows alternative design methods for demonstrating fire resistance ratings including calculation methods and engineering analyses for steel, concrete, and wood members. Greater design flexibility is provided for generic or custom assemblies in new construction that are not strictly found in the UL Fire Resistance Directory. This change also provides additional options for determining fire resistance ratings of structural members in existing buildings. The 6<sup>th</sup> Edition provided some general guidelines in Appendix F but no calculation methods for determining the fire resistance rating of archaic construction methods. The 7<sup>th</sup> Edition will permit the use of industry accepted calculation methodologies for the protection of steel, concrete, and wood members.

**703.5 Spray-Applied Fire Resistive Materials:**

Building owners will now be required to have special inspections performed to verify thickness, density, and bond strength of SFRM on structural steel. These are typically provided by a third party agency. The 6<sup>th</sup> Edition did not specifically require SFRM special inspection in Chapters 17 and 22. The 7<sup>th</sup> Edition requires special inspections for SFRM in Section 115.2 as well as 703.5. The technical requirements are based in large part upon the ASTM E605 and ASTM E736 protocols and are detailed in Section 1705 (currently labeled as 17.5 in the draft).

**704.11 Parapets:**

Parapets extending a minimum of 30" above the roof and having a fire resistance rating equal to that of the exterior wall are now required. Several exceptions are available that can minimize or eliminate this obligation.

**Table 705.4 Fire Wall Fire Resistance Ratings:**

A 3 hour fire resistance rating is now required for fire walls separating Use Groups A, B, E, H-4, I, R-1, R-2, and U. These designs would require 3 hour fire doors and opening protectives. A 2 hour fire resistance

rating is permitted for these Use Groups in buildings of Type II or V construction. These designs would be permitted to use 1½ hour fire doors and opening protectives. The 6<sup>th</sup> Edition permitted 2 hour fire walls for any construction type with the exception of 3 hour walls required in Type 2B.

**705.5 Horizontal Continuity (of Fire Walls):**

Fire walls are now required to extend 18" beyond the exterior surface of exterior walls. Several exceptions are available that can minimize or eliminate this obligation. One such exception permits the fire wall to terminate at the interior surface of noncombustible exterior sheathing in fully sprinklered buildings.

**706 Fire Barriers:**

"Fire separation assemblies" (continuous to underside of deck) under the 6<sup>th</sup> Edition are now referred to as "fire barriers." Technical requirements remain unchanged.

**707.14.1 Elevator Lobby:**

Elevator lobbies are now required in unsprinklered buildings, Use Group I-3 buildings, and in buildings that are more than 4 stories above the lowest level of fire department access.

**708.1 General (Fire Partitions):**

Fire resistance rated tenant separation walls (fire partitions) are only required in covered mall buildings. The 6<sup>th</sup> Edition previously required rated tenant separations based on construction type through Table 602.

**710 Smoke Partitions:**

Smoke partition requirements are more clearly addressed in the 7<sup>th</sup> Edition.

**715.3.3 Door Assemblies in Corridors and Smoke Barriers:**

All corridor fire door assemblies (door and frame) with a fire resistance rating of 20 minutes and greater are now required to be smoke- and draft-control doors listed in accordance with UL 1784. In general, this provision will apply to Use Group R corridors where a ½ hour rated corridor with 20 minute opening protectives is required. This provision will not impact fully sprinklered buildings in Use Group A, B, E, F, M, S and U which do not require fire resistance rated corridor construction.

**716.5.3.1 Penetrations of Shaft Enclosures:**

Shaft penetrations by ducts now require the installation of smoke dampers in addition to fire dampers. Limited exceptions are available for the omission of fire dampers and/or smoke dampers. Smoke dampers are motorized units that work in conjunction with duct smoke detectors and interface with the building fire alarm system. In general, HVAC designs will result in higher equipment first costs and higher maintenance costs due to the new smoke damper requirement.

**716.5.4.1 Corridors (Penetrations):**

Duct and air transfer penetrations of rated corridor walls now require the installation of smoke dampers. Similar to shaft penetrations, HVAC designs will result in higher equipment first costs and higher maintenance costs due to the new smoke damper requirement for rated corridor walls.

**CHAPTER 8:****801.1.3 Applicability:**

Flood hazard areas and flood damage-resistant materials are now regulated under Chapter 8.

**803 Wall and Ceiling Finishes:**

The interior finish rating system scale has been changed from Class I, II, and III under the 6<sup>th</sup> Edition to Class A, B, and C under the 7<sup>th</sup> which is consistent with the 2003 IBC base code. The technical requirements (flame spreads) remain unchanged.

**803.2 Interior Wall or Ceiling Finishes Other Than Textiles:**

Wall and ceiling finishes are now required to demonstrate compliance with the full-scale NFPA 286 test in addition to ASTM E84. This change may limit the types of interior finish materials that can be used in design due to these additional testing requirements. This is a requirement from the 2003 IBC base code and is not a Massachusetts amendment.

**804.5.1 Minimum Critical Radiant Flux (for Floor Finish):**

Carpet compliant with the DOC "pill test" (all carpet sold in the US is required to pass the DOC "pill test") is only permitted to be substituted for Class II floor finish in buildings sprinklered in accordance with NFPA 13. This exception no longer applies to NFPA 13R systems which were permitted under 780 CMR (6<sup>th</sup> Edition) 805.3 to use this exception. The language in the 7<sup>th</sup> Edition draft is consistent with the 2003 IBC base code and is not a Massachusetts amendment.

**CHAPTER 9:**

**901.2 Required Systems:** Changed "applicable references listed in Appendix A" to "applicable reference standards listed in Chapter 35".

**901.4 Maintenance:** Changed "Appendix A" to "Chapter 35" throughout the section.

Changed section to read: The owner, ~~tenant, lessee~~ of every building shall be responsible for the care and maintenance of all fire protection systems, including equipment and devices, to ensure the safety and welfare of the occupants. No person shall shut off, disconnect, obstruct, remove or destroy, or cause or permit to be shut off, disconnected,

*obstructed, removed, or destroyed, any part of any sprinkler system, water main, hydrant, or other device used for fire protection or carbon monoxide detection and alarm in any building owned, leased or occupied by such person or under his control or supervision, without first procuring a written permit so to do from the head of the fire department of the city or town wherein such building is situated in accordance with M.G.L. c. 148 s. 27A."*

**901.6 Signs:** *Removed Exception following 901.6 and added the following sections.*

**901.6.1 Sprinkler control valve room signage.** Where sprinkler control valves are located in a separate room or building, a sign shall be provided on the entrance door. The lettering shall be at least 2½ inches (63.5 mm) in height and shall otherwise conform to 780 CMR 901.6 and shall read "Sprinkler Control Valves."

**901.6.2 Fire department connections signage.** A metal sign with raised letters at least one inch (25 mm) in height shall be mounted on all fire department connections serving *sprinklers* or *standpipes*. Such signs shall read "Automatic Sprinklers" or "Standpipe," or both, as applicable.

**901.7 – 901.7.4 Fire Protection Systems Approval/Acceptance:** *Moved Sections 903.1 – 903.4.1 to this location in code. Changes in these sections are listed below.*

**901.7.1 Required:** Complete *fire protection construction documents* shall be submitted in accordance with 780 CMR 110 and this section and a building permit obtained prior to the installation of all "required" or "non required" fire protection systems, including *modifications, alterations, additions or deletions* to an existing fire protection system. The *fire protection construction documents* shall contain sufficient information to completely describe the *fire protection systems*, including operational features. The information required pursuant to 780 CMR ~~903.0~~ 901.7 shall include, where required, the items listed in 780 CMR ~~903.1.1~~ 901.7.1.1:

**901.7.1.1 Fire Protection Construction Documents:**

Added:

19. Fire command center location.
20. Type/description and location of any emergency alarm system.
21. Type/description and location of any carbon monoxide protection.

**901.7.1.4 As-built plans:** *Changed to:* "As built plans shall be provided to the building owner for all fire protection and life safety systems that are sealed as reviewed and approved by the registered Professional Engineer or legally recognized professional performing Construction Control. Where changes to original shop drawings are minor, a list of as-

built changes shall be permitted to be submitted where sealed and reviewed and approved by the registered Professional Engineer or legally recognized professional performing Construction Control. “

**902.0 Definitions:** *Added several new definitions.*

**903.1.1 Sprinklered Throughout** – *Added Section* “Sprinklered throughout shall mean sprinkler protection in all areas required by the applicable design and installation automatic fire sprinkler standard and this Code.”

**903.2 Where Required – Exceptions:** *Added the following exceptions:*

1. Any room where the application of water, or flame and water, constitutes a serious life or fire hazard and protected by an alternative automatic fire-extinguishing system in accordance with 903.1.1.
5. Sprinklers shall not be required in noncombustible and limited combustible concealed spaces and plenums that contain electrical, data, communications and other cables that are of the types and in the configurations permitted in such spaces by the *Massachusetts Electrical Code* (527 CMR 12).
6. Sprinklers may be omitted in Transformer Vaults where all the following conditions are satisfied:
  1. The cable within the vault is flame retardant or limited combustible.
  2. The dielectric fluid is a limited combustible fluid.
  3. The vault is enclosed in three hour fire resistance rated construction.
  4. The vault is at grade or no more than one level below grade. Access to the vault is directly from the exterior or via a dedicated two hour passageway.
  5. The vault is protected with automatic smoke detection connected to the building fire alarm system which notifies the fire department upon activation.
  6. The room is limited to the sole use of the transformer equipment and is limited in size to accommodate said equipment only. Storage is prohibited in the vault enclosure.
  7. The vault is provided with spill containment.
  8. An emergency fire plan has been developed with and approved by the fire department.
  9. Continuous ventilation is provided for the vault enclosure in accordance with the ventilation requirements of NFPA 30.
  10. The ventilation equipment is dedicated to serve the vault only.
  11. Emergency power is provided for the ventilation equipment.
  12. The vault is no larger in area than 2400 sq. ft.

7. Sprinklers may be omitted in Transformer Vaults where all the following conditions are satisfied:

1. An alternative suppression system is provided for the vault.
2. Continuous ventilation is provided for the vault enclosure in accordance with the ventilation requirements of NFPA 30. Emergency power shall be provided for the ventilation equipment and the ventilation shall be dedicated to serve the vault only.

**903.2.1 Group A:** *Sprinkler requirements for assembly buildings changed to:* "An automatic sprinkler system shall be provided throughout buildings having a Group A occupancy as provided in this section."

**903.2.1.1 Group A-1.** An automatic sprinkler system shall be provided throughout buildings having a Group A-1 occupancy.

**903.2.1.2 Group A-2.** An automatic sprinkler system shall be provided throughout buildings as further described in 780 CMR 903.2.1.2.1 and 903.2.1.2.2.

**903.2.1.2.1 Group A-2nc.** An automatic sprinkler system shall be provided throughout buildings having a Group A-2nc occupancy where the occupant load is 50 or greater.

**903.2.1.2.2 Group A-2r** An automatic sprinkler system shall be provided throughout buildings having a Group A-2r occupancy where any of the following conditions exists:

1. The floor area exceeds 5,000 square feet (464.5 m<sup>2</sup>).
2. The floor area has an occupant load of 300 or more.
3. The floor area is located on a floor other than the level of exit discharge.

**903.2.1.3 Group A-3.** An automatic sprinkler system shall be provided throughout buildings having a Group A-3 occupancy where any of the following conditions exists:

1. The aggregate floor area of the building exceeds 5,000 square feet (1115 m<sup>2</sup>).
2. The Group A-3 occupancy has an occupant load of 300 or more.
3. The Group A-3 occupancy is located on a floor other than the level of exit discharge.

**Exception:** Areas used exclusively as participant sports areas where the main floor area is located at the same level as the level of exit discharge of the main entrance and exit.

**903.2.1.4 Group A-4.** An automatic sprinkler system shall be provided throughout buildings having a Group A-4 occupancy where any of the following conditions exists:

1. The aggregate floor area of the building exceeds 7,500 square feet (1115 m<sup>2</sup>).
2. The Group A-4 occupancy has an occupant load of 300 or more.
3. The Group A-4 occupancy is located on a floor other than the level of exit discharge.

**Exception:** Areas used exclusively as participant sports areas where the main floor area is located at the same level as the level of exit discharge of the main entrance and exit.

**903.2.1.5 Group A-5.** An automatic sprinkler system shall be provided in concession stands, retail areas, press boxes and other accessory use areas in excess of 1,000 square feet (93 m<sup>2</sup>).

**903.2.3 Group E:** *Added* "2. Throughout every portion of educational buildings below the level of exit discharge."

**903.2.4 Group F-1:** *Added* "2. Group F-1 occupancy is located more than three stories above grade.

3. Where there is a woodworking operation in excess of 2,500 square feet (232 m<sup>2</sup>) in area that generates finely divided combustible waste or uses finely divided combustible materials."

**903.2.5.1 Pyroxylin plastics.** *Added* "An automatic sprinkler system shall be provided in buildings, or portions thereof, where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds (45 kg) (Also refer to 527 CMR)."

**903.2.7 Group M:** *Added*

2. The Group M occupancy is located more than three stories above grade.

3. Bulk merchandising stores as defined in 426.0.

**903.2.8 Group R. – Exception 2:** For one- or two-family "stand-alone" dwellings classified as R-3 buildings, refer to 780 CMR 5303.13.5 – Note, however, that townhouses are required to be sprinklered.

**903.2.9 Group S-1:** *Added*

2. Throughout the building, where a Group S-1 occupancy is located more than three stories above grade.

**903.2.9.1 Repair garages.** An automatic sprinkler system shall be provided throughout all buildings having a repair garages-where any of the following conditions exists:

1. Where the building is two or more stories in height, including basements, and contains a repair garage exceeding 10,000 square feet (929 m<sup>2</sup>).

2. The aggregate floor area of the building exceeds 12,000 square feet (1115 m<sup>2</sup>).

3. A repair garage is located in a basement.

**903.2.10 Group S-2.** An automatic sprinkler system shall be provided for Group S-2 occupancies as follows:

1. Throughout buildings classified as Group S-2 Enclosed Parking.

2. Throughout Group S-2 Enclosed Parking located beneath other groups.

**903.2.10.1 Commercial parking garages.** An automatic sprinkler system shall be provided throughout buildings used for storage of commercial trucks or buses where the aggregate floor area used for parking exceeds 5,000 square feet (464 m<sup>2</sup>).

**903.2.11 All occupancies (except Groups R-3 and U).** An automatic sprinkler system shall be installed in the locations set forth in Sections 903.2.11.1 through 903.2.11.1.3.

**Exception:** Group R-3 and Group U.

**903.2.11.1 Stories and basements without openings.** An automatic sprinkler system shall be installed throughout every story or basement of all buildings where the floor area exceeds 1,500 square feet (139.4 m<sup>2</sup>) and where there is not provided at least one of the following types of exterior wall openings:

1. Openings below grade that lead directly to ground level by an exterior stairway complying with Section 1009 or an outside ramp complying with Section 1010. Openings shall be located in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side.

2. Openings entirely above the adjoining ground level totaling at least 20 square feet (1.86 m<sup>2</sup>) in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side.

**903.2.11.1.1 Opening dimensions and access.** Openings shall have a minimum dimension of not less than 30 inches (762 mm). Such openings shall be accessible to the fire department from the exterior and shall not be obstructed in a manner that fire fighting or rescue cannot be accomplished from the exterior.

**903.2.11.2 Rubbish and linen chutes.** An automatic sprinkler system shall be installed at or above the topmost service opening of rubbish and linen chutes and in their terminal rooms. Chutes extending through three or more floors shall have additional sprinkler heads installed within such chutes at alternate floors. Chute sprinklers shall be accessible for servicing.

**903.2.11.3 Buildings over 55 feet in height.** An automatic sprinkler system shall be installed throughout buildings with a floor level having an occupant load of 30 or more that is located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access.

**Exceptions:**

1. Airport control towers.
2. Open parking structures.

**903.3.1.2.1 Balconies:** Sprinkler protection shall be provided for exterior balconies and ground-floor patios of dwelling units where the building is of Type V construction. Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members, and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies that are constructed of open wood joist construction.

**Section 904 Alternative Automatic Fire Extinguishing Systems:** *This new section combines 780 CMR 909.0 – 912.0 and has more detailed requirements for alternative automatic fire extinguishing systems.*

**Section 905 Standpipe Systems:** *Standpipe systems shall be installed in accordance with NFPA 14 and the requirements listed in this section. These section requirements are more detailed and in some cases more stringent.*

**906.2 Where required:** A portable fire extinguisher shall be installed in the following locations in accordance with NFPA 10 listed in **Chapter 35:**

1. In all occupancies in Use Group A-1, A-2, A-3, B, E, I-2, M, R-1 or H;
2. In all areas containing commercial kitchen exhaust hood systems;
3. In all areas where fuel is dispensed;
4. In all areas where a *flammable* or *combustible liquid* is used in the operation of spraying, coating or dipping;
5. In all occupancies in Use Group I-3 at staff locations. Access to portable extinguishers shall be permitted to be locked;
6. On each completed floor of buildings under construction, other than occupancies in Use Group R-3.
7. In any laboratory, shop or other room occupied for similar purposes; and

**Section 907. Fire Alarm and Detection Systems**

**Section 907.1.1.1** – *Requires that the construction documents submitted for a building permit also have with it dedicated plans that indicate use of all rooms, and documents that show the primary power connection.*

**907.2 Where Required:** *Where an automatic sprinkler protection system is provided in accordance with Section 903.3.1.1 or 903.3.1.2 and is connected to the building's fire alarm system automatic heat detection shall not be required by this section. The rest of this section provides a more detailed and in some cases more stringent requirements for when and which type of an alarm system is required.*

**907.2.12.3 Fire department communication system:** *A fire department communication system is now required to be provided operating between a fire command center and elevators, elevator lobbies, emergency and standby power rooms, fire pump rooms, areas of refuge and inside enclosed exit stairways. An exception allows the substitution of fire department radio systems where approved by the fire department. Additional new requirements in this section are as follows:*

**907.2.13 Atriums connecting more than two stories:** *A fire alarm system shall be installed in occupancies with an atrium that connects more than two stories...Such occupancies in Group A, E or M shall be provided with an emergency voice/alarm communication system complying with the requirements of Section 907.2.12.2.*

**907.2.14 High-piled combustible storage areas:** *An automatic fire detection system shall be installed throughout high-piled combustible storage areas greater than 500 square feet. Exception: Buildings protected throughout with automatic sprinklers.*

**907.2.15 Delayed egress locks:** *Where delayed egress locks are installed on means of egress doors in accordance with Section 1009.1.8.6, an automatic smoke or heat detection system shall be installed as required by that section.*

**907.2.16 Aerosol storage uses:** *Aerosol storage rooms and general-purpose warehouses containing aerosols shall be provided with an approved manual fire alarm system where required by the International Fire Code and 527 CMR.*

**907.2.17 Lumber, plywood and veneer mills:** *Lumber, plywood and veneer mills shall be provided with a manual fire alarm system.*

**907.2.18 Underground buildings with smoke exhaust system:** *Where a smoke exhaust system is installed in an underground building in accordance with this code, automatic fire detectors shall be provided in accordance with this section.*

**907.2.18.1 Smoke detectors:** *This section specifies mechanical and similar rooms, elevator lobbies, and connections to vertical duct risers as requiring smoke detectors.*

**907.2.18.2 Alarm required:** *Activation of the smoke exhaust systems shall activate an audible alarm at a constantly attended location and*

activate the alarm notification appliances throughout the building in accordance with 907.10.

**907.2.19 Public address system:** Where a fire alarm system is not required by Section 907.2, a public address system shall be provided that shall be capable of transmitting voice communications to the highest level of exit discharge serving a mall, required or otherwise, shall be accessible to the fire department. The system shall be provided in accordance with Section 907.2.12.2.

**907.2.21 Residential aircraft hangars:** *This new section requires a listed heat detector.*

**907.2.22 Airport traffic control towers:** *Must now be fully sprinklered.*

**907.2.23 Battery rooms:** *Now require smoke detection.*

**907.2.24 Buildings with sleeping areas:** *Now always require smoke detection.*

**907.3 Manual fire alarm boxes:** *Have new installation requirements.*

*There are several pages of similar new language and requirements covering zones, wiring, annunciation, etc., of alarm systems.*

**909 Smoke Control Systems:** *This section has been completely rewritten and appears to largely coincide with the IBC requirements. The general level of required smoke control will be greater than under the 6<sup>th</sup> edition methodology.*

**910 Smoke and Heat Vents:** *These requirements are also taken directly from IBC 2003 and are unlike the requirements of the 6<sup>th</sup> edition.*

**911 Fire Command Center:** *This is a new section taken directly from the IBC encompassing detailed requirements for a fire command center required by other sections of the code.*

**912 Fire Department Connections:** *This section has been relocated and brought into line with the IBC 2003.*

## CHAPTER 10:

### Table 1004.1.2 Maximum Floor Area Allowances Per Occupant:

*This table has been expanded to address more specific occupant load factors for certain areas such as dormitories, exercise rooms, locker rooms, and swimming pools. There is also an important change in calculating the standing space in an assembly occupancy, calculated at 3 net sf per occupant in the 6<sup>th</sup> edition but now to be calculated at 5 net sf per occupant in the 7<sup>th</sup> edition, resulting in lower allowed occupant numbers for bars and restaurants.*

### 1012.3 Opening Limitations (in Guards):

*The "ladder effect" prohibition previously contained in 780 CMR (6<sup>th</sup> Edition) 1021.3 no longer applies. Greater design flexibility (and perhaps*

less concern regarding liability) will be possible for ornamental patterns used in guards and handrails.

**1014.2.1 ex 2 Two Exits or Exit Access Doorways (Remoteness):**

Remoteness of exits in sprinklered buildings is now required to be at least 1/3 of the overall diagonal, rather than 1/4 as previously permitted by 780 CMR (6<sup>th</sup> Edition) 1006.4.1 exception.

**1014.2.2 ex Three or More Exits or Exit Access Doorways (Remoteness):**

Remoteness of any two exits in sprinklered buildings is now required to be at least 1/3 of the overall diagonal, rather than 1/4 as previously permitted by 780 CMR (6<sup>th</sup> Edition) 1006.4.1.1.

**Table 1015.1 Exit Access Travel Distance:**

Exit access travel distance in sprinklered Use Group B buildings is now permitted to be a maximum of 300 ft rather than 250 ft under 780 CMR (6<sup>th</sup> Edition) Table 1006.5. Greater design flexibility will be possible as a result of this change.

**1016.3 ex 2 Dead Ends:**

Dead ends up to 50 ft are now permitted in fully sprinklered Use Group B buildings. The 6<sup>th</sup> Edition previously limited dead ends to 20 ft in Use Group B and only permitted 50 ft dead ends when the path was defined by partitions or dividers not more than 6 ft in height. This new provision will provide greater design flexibility for Use Group B buildings.

**Table 1018.2 Buildings With One Exit:**

Unlike all previous editions this table is proposed to be adopted without modification, adding several Use Groups to the Massachusetts code, most notable use group R in general and Use Group R-2 specifically. Greater design flexibility and a more streamlined permitting process will be available under this change. Single exit townhouse or apartment buildings that discharge directly to the exterior in conformance with this table will now be permitted without a variance. Similar designs under the 6<sup>th</sup> Edition required a variance from the Building Code Board of Appeal due to an inherent conflict with 780 CMR (6<sup>th</sup> Edition) 1010.2 which required a minimum of 2 exits to be provided from every floor level, including spaces with one means of egress.

**1019.1 ex 8 Vertical Exit Enclosures:**

Open stairs are now permitted to be used for egress subject to specific conditions. Exception 8 allows up to 50% of stairs to be open and used for egress when connecting up to 2 floors of a building. The interconnected floors must be separated from other floor openings. This exception applies equally to both sprinklered and unsprinklered buildings. The 6<sup>th</sup> Edition did not allow open stairs to be used for egress per 780

CMR (6<sup>th</sup> Edition) 1014.11. Greater design flexibility will be possible under this change.

**1019.1 ex 9 Vertical Exit Enclosures:**

Open stairs are now permitted to be used for egress subject to specific conditions. Exception 9 allows all stairs connecting the first floor and second floor only in buildings protected by an NFPA 13 sprinkler system to be open and used for egress. This exception does not apply to NFPA 13R sprinkler systems. The 6<sup>th</sup> Edition did not allow this. Greater design flexibility will be possible under this change.

**1019.1.4 Vertical Exit Enclosure Exterior Walls:**

Exterior wall/opening protection within 10 ft of an exit enclosure is now only required when the angle formed between these two elements is less than 180 degrees. Design costs will be reduced and the permitting process will be streamlined under this change. Rated protection (1 hr exterior walls with  $\frac{3}{4}$  hour opening protectives within 10 ft) is only required for exterior walls that at an angle of less than 180 degrees with respect to the exterior wall of an exit stair enclosure. Previous designs at angles of 180 degrees or greater required this additional protection or required a variance from the Building Code Board of Appeal for relief from 780 CMR (6<sup>th</sup> Edition) 1014.11.1.

**1019.1.8 Smokeproof Enclosures:**

The current draft language indicates all exits greater than 75 ft above the lowest level of fire department vehicle access require a smokeproof enclosure or pressurization. This language is based on the 2003 IBC high rise definition which conflicts with the Massachusetts amendment in Section 403.13 of 70 ft in height. We suspect that this is a coordination issue that will be resolved prior to final publication by changing this language to reflect the Massachusetts high rise definition using 70 ft.

**CHAPTER 13:**

The "Energy Conservation" chapter of the Massachusetts State Building Code has been, under the 6<sup>th</sup> edition, and will continue to be, under the 7<sup>th</sup> edition, completely unique to Massachusetts. Massachusetts differentiates between "low-rise residential buildings" (defined as buildings in Use Groups R-2, R-3, R-4, or R-5 three stories or less in height) and all other construction. Low-rise residential buildings were regulated under Appendix J in the 6<sup>th</sup> edition and will be regulated under Chapter 61 of the 7<sup>th</sup> edition. Chapter 61 of the 7<sup>th</sup> edition has been published as part of the "Building Code for One- and Two-family Dwellings", the review of which is not included in the scope of this document. An exception to the applicability of the proposed Chapter 13 allows buildings of any use with

*total floor areas not greater than 10,000 square feet to be designed and constructed using the envelope requirements of Chapter 61.*

**1302.0 Definitions:** *A definition has been added for “continuous air barrier” as follows: the combination of interconnected materials and assemblies, joined and sealed together with flexible joints that provide the air-tightness of the building envelope above and below grade that separate conditioned from unconditioned space, or from space with conditions that differ by more than 50%.”*

*A definition has been added for “new energy” as follows: “energy, other than recovered energy, utilized for the purpose of heating or cooling”.*

**1304.1.2 Moisture Control:** *The 6<sup>th</sup> edition term “vapor barrier” has been changed to “vapor retarder” and the requirement for a “maximum permeability of zero point one (0.1) perm or less, per Chapter 24 in 1997 ASHRAE Fundamental Handbook, (equivalent to a 4 mil polyethylene sheet)” has been deleted.*

**1304.3.1 Air Barriers:** *The following changes have been made to this section:*

The continuous air barrier shall have the following characteristics:

~~1. It must be continuous, with all joints made air-tight.~~

1. Materials used in the continuous air barrier shall have an air permeability permeance not to exceed 0.004 cfm/sf under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02L/sm<sup>2</sup>@75 Pa.) when tested in accordance with ASTM E 2178. Air barrier materials shall be taped or sealed in accordance with the manufacturer’s instructions.

~~4. It shall be durable or maintainable.~~

3. Air barrier materials shall be maintainable, or, if inaccessible, shall meet durability requirements for the service life of the envelope assembly.

~~5. 4. The air barrier material of an envelope assembly shall be joined and sealed in a an air-tight and flexible manner to the air barrier material of adjacent systems assemblies, allowing for the relative movement of systems assemblies due to thermal and moisture variations and creep.~~

**1304.4.3 Recessed Equipment:** *Both the 6<sup>th</sup> and the proposed 7<sup>th</sup> editions reference the 1997 ASHRAE Handbook of Fundamentals. For calculating the effects of reducing insulation where recessed equipment is installed in the building envelope. ASHRAE has since published both a 2001 and a 2005 version of this Handbook. This is also true in section*

**1305.2.2 Calculation of heating and cooling loads.** **1305.3.2 Calculation of heating and cooling loads** *references the ASHRAE Handbook of Fundamentals but does not specify a year. Neither does the reference in this section to the ASHRAE HVAC Systems and Equipment Handbook mention a year.*

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**Table 1305.3.3(1)-(11)** set minimum efficiency requirements for various mechanical equipment. The tables have been extensively updated with more restrictive requirements and new mandated test procedures.

**Table 1308.6.2.1 Lighting Power Densities Using the Building Area Method:** This table has been updated with reduced watt/sf allowances. Footnotes have been added to clarify the application of the table under specific circumstances.

**Table 1308.6.2.2 Space-by-Space Method of Calculating Interior Lighting Power Allowance:** The table has been updated with reduced watt/sf allowances. Footnotes have been added to clarify the application of the table under specific circumstances.

**1308.6.2.3 Additional Interior Lighting Power:** This section has been incorporated into the footnotes of Table 1308.6.2.

**Table 1308.7 Lighting Power Limits for Building Exteriors:** This table has been expanded and the maximum allowed lighting power densities reduced. The exceptions to the requirements of this Table have increased.

#### **CHAPTER 34:**

This chapter regulating repair, alteration, addition and change of use of existing buildings will continue to be completely unique to Massachusetts. Minor clarifications to the “architectural” portion of Chapter 34 have been made, and a more extensive reworking of the structural section (3408.0) is proposed. For the first time full or partial compliance with the code requirements for new construction addressing wind loads, seismic loads, live loads, snow loads, etc. can now be triggered by the renovation of an existing building even when no change in use occurs. For historic buildings the general exception from seismic compliance in the 6<sup>th</sup> edition has been eliminated so that now only historic “house museums” are exempt (see Section 3408.7.7). Historic buildings that are not classified as “house museums” are subject to all structural requirements of Section 3408 without exception.

**3400.3 Applicability: 6. Assembly use groups, 7. Institutional use groups, and 8. Residential use groups.** Where the 6<sup>th</sup> edition stated that a change to any one of these use groups or within any of these use groups must comply with the code for new construction, the proposed 7<sup>th</sup> edition has removed the reference to changes within these use groups. This eliminates any confusion about a requirement to meet the code for new construction if changing use from A-1 to A-2, for instance.

**10 Structural Requirements:** The exemptions for compliance with wind and seismic load have been eliminated for Totally Preserved Historic

*Buildings, and the exemption for compliance with seismic loads have been eliminated for Partially Preserved Historic Buildings.*

**11 Energy conservation requirements:** *This is a new section which states that “Energy conservation requirements for additions, and for existing buildings subject to repair, alteration and/or change of use, shall be in accordance with 780 CMR 3407.” The statement that additions will be subject to the energy requirements of 3407 and not Chapter 13 is inconsistent with the intent of Chapter 34 and probably a misprint.*

**12 Flood Resistant Construction:** *This is a new section that states “renovations to existing buildings in areas prone to flooding are subject to the requirements of 780 CMR 3107.0”, adding a reference to important requirements for existing buildings in the “flood-resistant construction” section of the code.*

**3400.3.1 Buildings which qualify:** *This section states that a building must be at least five years old and free of outstanding notices of violation or other orders of the building official. There are two exceptions to this section, existing buildings changing to either a day care center or a limited group residence, both of which must comply with the requirements of Chapter 4, Special Use and Occupancy. A qualification has been added to both of these exceptions stating “For other than structural work”.*

**3400.4 Special Provisions for Means of Egress:** *The following requirements, some of which previously appeared in different formats, have been added to this section:*

**3400.4.1.1 Assembly nightclubs (A-2) main entrance/exit door size:** *Where the occupant load of an existing A-2 use is 50 or greater, the main entrance/exit door shall be a minimum 72 inches (nominal) width. This main entrance/exit door shall consist of a pair of side-hinges swinging type doors without a center mullion and shall be equipped with panic hardware- also see section 1011.3.*

**3400.4.2 Fire Escapes:** *Fire escapes shall be permitted only as provided for in 780 CMR 3400.4.2.*

**3400.4.2.1 New buildings:** *Fire escapes shall not constitute any part of the required means of egress in new buildings.*

**3400.4.2.2 Existing fire escapes:** *Existing fire escapes shall be continued to be accepted as a component in the means of egress in existing buildings only.*

**3400.2.3 New fire escapes:** *New fire escapes for existing buildings shall be permitted only where exterior stairs cannot be utilized due to lot lines limiting stair size or due to the sidewalks, alley or roads at grade level. New fire escapes shall not incorporate ladders or access by windows.*

**3400.4.2.4 Limitations:** Fire escapes shall comply with this section and shall not constitute more than 50 percent of the required number of exits nor more than 50 percent of the required exit capacity.

**3400.4.2.5 Location:** Where located on the front of the building and where projecting beyond the building line, the lowest landing shall not be less than 7 feet or more than 12 feet above grade, and shall be equipped with a counterbalanced stairway to the street. In alleyways and thoroughfares less than 30 feet wide, the clearance under the lowest landing shall not be less than 12 feet.

**3400.4.2.6 Construction:** The fire escape shall be designed to support a live load of 100 pounds per square foot and shall be constructed of steel or other approved noncombustible materials. Fire escapes constructed of wood not less than nominal 2 inches thick are permitted on buildings of Type 5 construction. Walkways and railings located over or supported by combustible roofs in buildings of Type 3 and 4 construction are permitted to be of wood not less than nominal 2 inches thick.

**3400.4.2.7 Dimensions:** Stairs shall be at least 22 inches wide with risers not more than, and treads not less than, 8 inches and landings at the foot of stairs not less than 40 inches wide by 36 inches long, located not more than 8 inches below the door.

**3400.4.2.8 Opening protectives:** Doors and windows along the fire escape shall be protected with 3/4 – hour opening protectives.

**3400.4.2.9 Testing and Certification:** All exterior bridges, steel or wooden stairways, fire escapes and egress balconies shall be examined and/or tested, and certified for structural adequacy and safety every five years, by a Massachusetts registered professional engineer, or others qualified and acceptable to the building official; said engineer or others shall then submit changes to the Building Official.

**3400.7 Change in Commodity or Storage Arrangements:** *This section is new and captures sprinkler requirements for changes in the nature of stored materials.*

Existing buildings, or portions thereof, in which there is a change in occupancy classification, commodity classification, or storage arrangement, as defined by NFPA 13, requires an evaluation of the existing sprinkler system for compliance with NFPA 13 and NFPA 25.

In enforcing the provisions of 780 CMR 3400.7 the building official may require or accept engineering or other evaluations of the fire protection systems in order to identify possible non-compliant conditions and acceptable solutions. If the evaluation determines that alterations are necessary, the building official shall order the abatement of such conditions.

**3401.0 Definitions:** *The term “totally preserved building” is not used in the draft 7<sup>th</sup> edition. The new term used is “House Museum”, the definition of which is identical to the definition of “totally preserved building” in the 6<sup>th</sup> edition.*

**3403.0 Hazard Index:** *The hazard indices for the following uses have been altered in the proposed 7<sup>th</sup> edition:*

<u>Use Group</u>	<u>Description</u>	<u>6<sup>th</sup> Ed. H.I.</u>	<u>7<sup>th</sup> Ed. H.I.</u>
R-1	Hotels, motels	2	4
R-2	Multi-family (4 or more dwellings)	2	4

**3404.20 Carbon Monoxide alarms:** *This is a new section which states that Carbon monoxide alarms are required and shall be selected and installed in accordance with the applicable requirements of 527 CMR and or 248 CMR. For any building undergoing substantial renovation, CO detection shall be brought up to the code for new construction.*

*This information is repeated in section 3405.3.*

**3407.5 Alternative Designs:** *This is a new section which states Alternative design methods may be used where it can be demonstrated through analysis by a licensed professional that the alternative will achieve a level of energy conservation equivalent to that required by 780 CMR 3407. A report on the energy conservation analysis shall be submitted to the building official with the application for the building permit.*

**3408 Structural Requirements for Existing Buildings:** *As noted above this section has been completely revised. Each project must now be classified in one of 5 “levels of work”. These levels are established based on floor area affected, as well as impact on structural systems. Due to the nature of the definitions of work levels (“removal, or removal and reconstruction, of between 15% and 40% of the total tributary area of horizontal framing of existing framed floors and roofs” is an example) the services of a structural engineer are required just to establish which level a project will fall in. However the following statement has been added to the section dealing with Structural Investigation of Existing Buildings:*

**3408.6.1.2 Responsibility of the architect:** *The architect of record shall verify that the changes to the existing building are in fact Level 1 Work, and so certify on the construction drawings.*

*Different levels of structural investigation and compliance with the requirements of the code for new construction are triggered by the level of proposed work. As with the 6<sup>th</sup> edition partially preserved historic buildings are expected to comply with the wind, seismic and snow load requirements of the code for new construction. The seismic hazard*

*categories of the 6<sup>th</sup> edition have been absorbed into the requirements of the different levels of work.*

If you have any questions please do not hesitate to call.

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